Evolis: versatility

Merlin Gerin
Modicon
Square D
Telemecanique

Schneider Electric

Evolis circuit breakers are used to protect and control public or industrial medium voltage electrical distribution networks.
Evolis is indoor switchgear that is particularly suited to the production and renovation of HV/MV, MV/MV and MV/LV sub-stations.
It is suitable for the protection of all types of application:
cables, lines, motors, capacitors, transformers, bus sectioning of sources, etc

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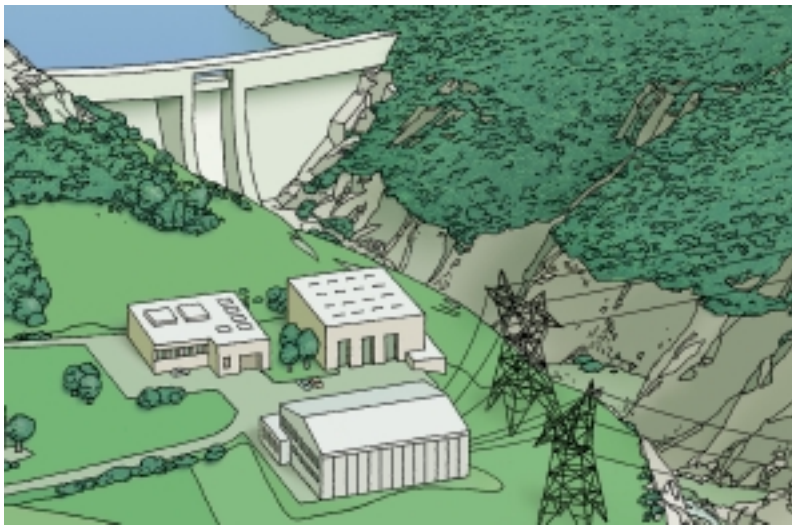

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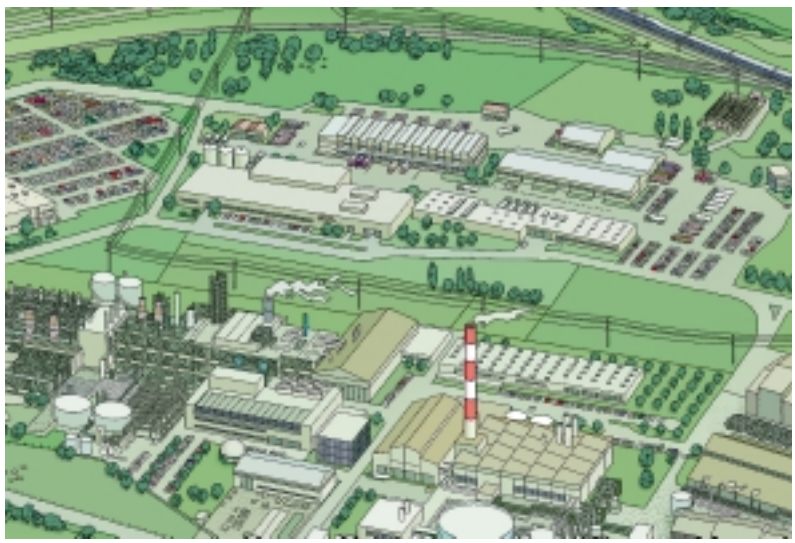


2 versions adapt to your fixed or withdrawable installation:

Full version
withdrawable with cradle

Modular version
basic circuit breaker with kits delivered in separate

Evolis: performance

What does Evolis offer you?

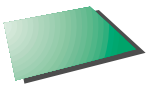
■ *The rating plates on the front of the circuit breaker also show the breaking capacity:*
□ *yellow: 25 kA*
□ *blue: 31.5 kA*
□ *red: 40 kA.*

The electrical characteristics are given in the circuit breaker designation

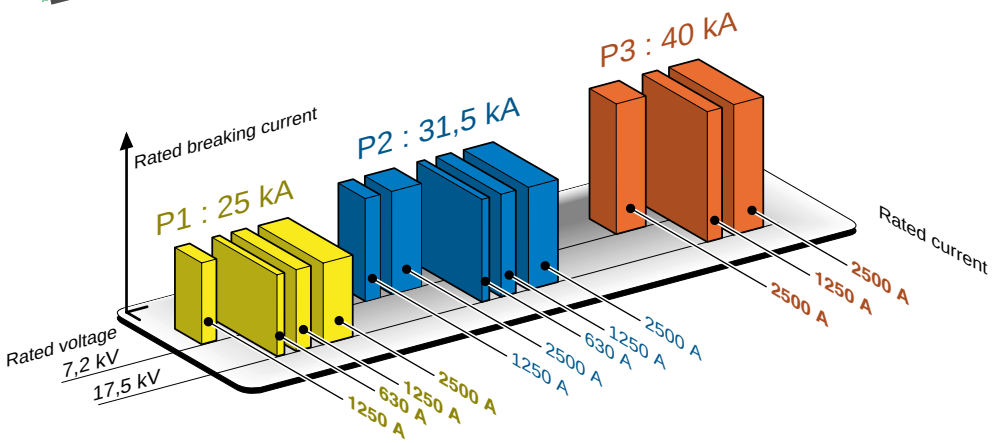
■ **3 rated voltages**
□ 7.2 kV index 7
□ 12 kV index 17
□ 17.5 kV index 17.

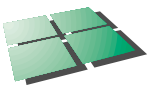
■ **3 breaking capacities**
□ 25 kA index P1
□ 31.5 kA index P2
□ 40 kA index P3.

■ **4 rated currents**
630, 1250, 1600, 2500 A.

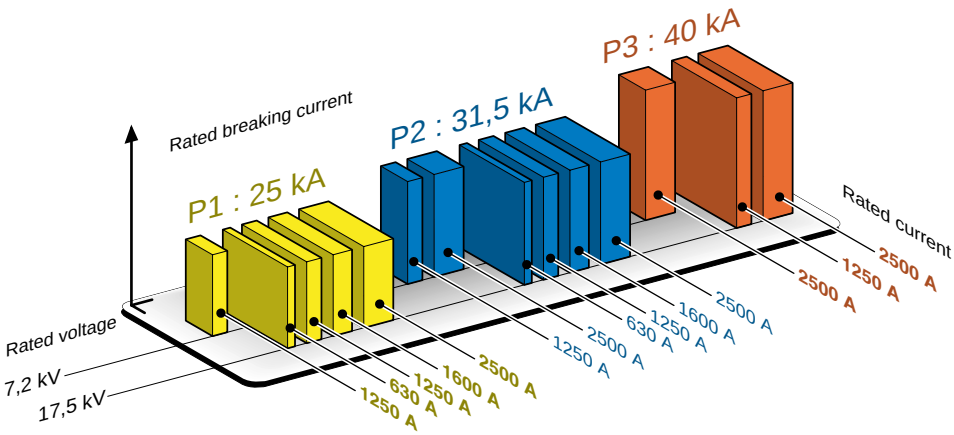


Full version





Modular version



Evolis: heavy duty and innovative

How does Evolis eliminate faults?

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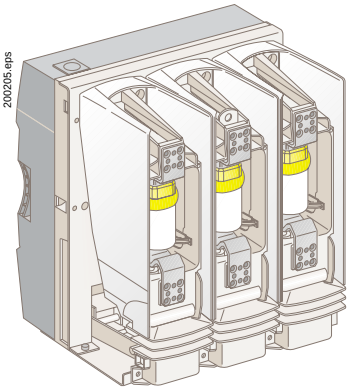

Electrical endurance

A magnetic field is applied along the axis of the vacuum interrupter contacts. This process maintains the arc in a diffuse mode even at high current values. It ensures optimum distribution of the energy over the contact surface thus avoiding localised hot spots.

■ The advantages of this technique:

□ a very compact vacuum interrupter
□ low dissipation of arcing energy in the bulbs.

Evolis is in conformity with highest electrical endurance class (IEC 60 056: class E2).

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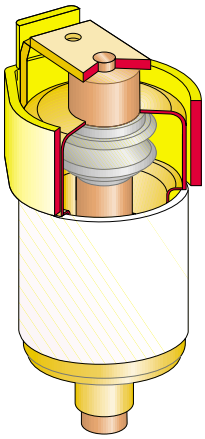

Mechanical endurance

■ This magnetic field is generated by a patented external coil which surrounds the contact zone. This solution provides many advantages:

□ a simplified and therefore reliable vacuum interrupter
□ heavy duty contacts which do not distort during repeated switching operations
□ considerable reduction in control mechanism energy.

■ For the first time, a low voltage device control mechanism has been integrated in a medium voltage circuit breaker. The Masterpact control mechanism used on Evolis provides the benefits of a system that has proven itself for over 10 years on hundreds of thousands of installations.

Evolis is in conformity with most demanding mechanical endurance class (IEC 60 056: class M2)

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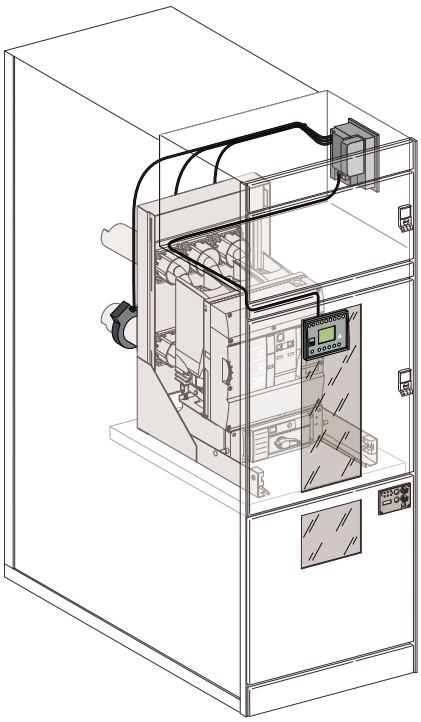


An integrated protection chain

The Sepam 1000$^+$ protection unit integrated with Evolis together with innovative current sensors, provide you with a comprehensive metering, protection and energy management chain.

■ A high performance and economical solution

□ Sepam 1000$^+$, through its modular offer, proposes a cost effective solution adapted to every requirement
□ one single sensor reference covers the circuit breaker's full operating range.

■ Easy to control and to install

□ all components in the protection chain are catalogued and delivered quickly
□ current sensors, developed in the circuit breaker environment, are simply mounted on the busducts
□ the operation of the entire protection chain with the Evolis circuit breaker has been extensively tested.

■The power of a multifunctional digital unit

Sepam 1000$^+$ is not a simple protection relay, it is a multifunctional unit notably providing:

□ circuit breaker diagnosis functions (number and time of switching operations, rearming time, cumulated switched A^2)
□ direct circuit breaker control whatever release unit type
□ remote equipment operation through the Modbus communication option.

Evolis:
tailored to your requirements

What does Evolis offer you?

Circuit breakers that combine simplicity of selection and richness of offer.

■ *2 versions are proposed:*
□ ***fullversion*** *comprising the withdrawable circuit breaker and its cradle*
□ ***modular version*** *comprising separately delivered kits.*

■ *"Universal" accessories can be added to either version.*
E.g:
coil, contact, motor, connection, inter-locking systems, etc

Full version:
a fully assembled and tested unit

■ As standard, the circuit breaker is equiped with all the components required for **"ready to use" withdrawable installation in metal clad cubicles.**
This unit is easy to integrate in a cubicle environment, all it needs is mechanically fixing in place. An installation guide explains the required operations in detail.

■ This version provides the guarantees of a highly reliable unit, whose components function in perfect harmony. Critical points such as inter-locking systems, dielectric withstand and temperature rise have been checked thoroughly during design.
It is a system that is fully integrated and tested by the manufacturer, in conformity with IEC standards 60 298 and 60 056.

Modular version: high added value accessories

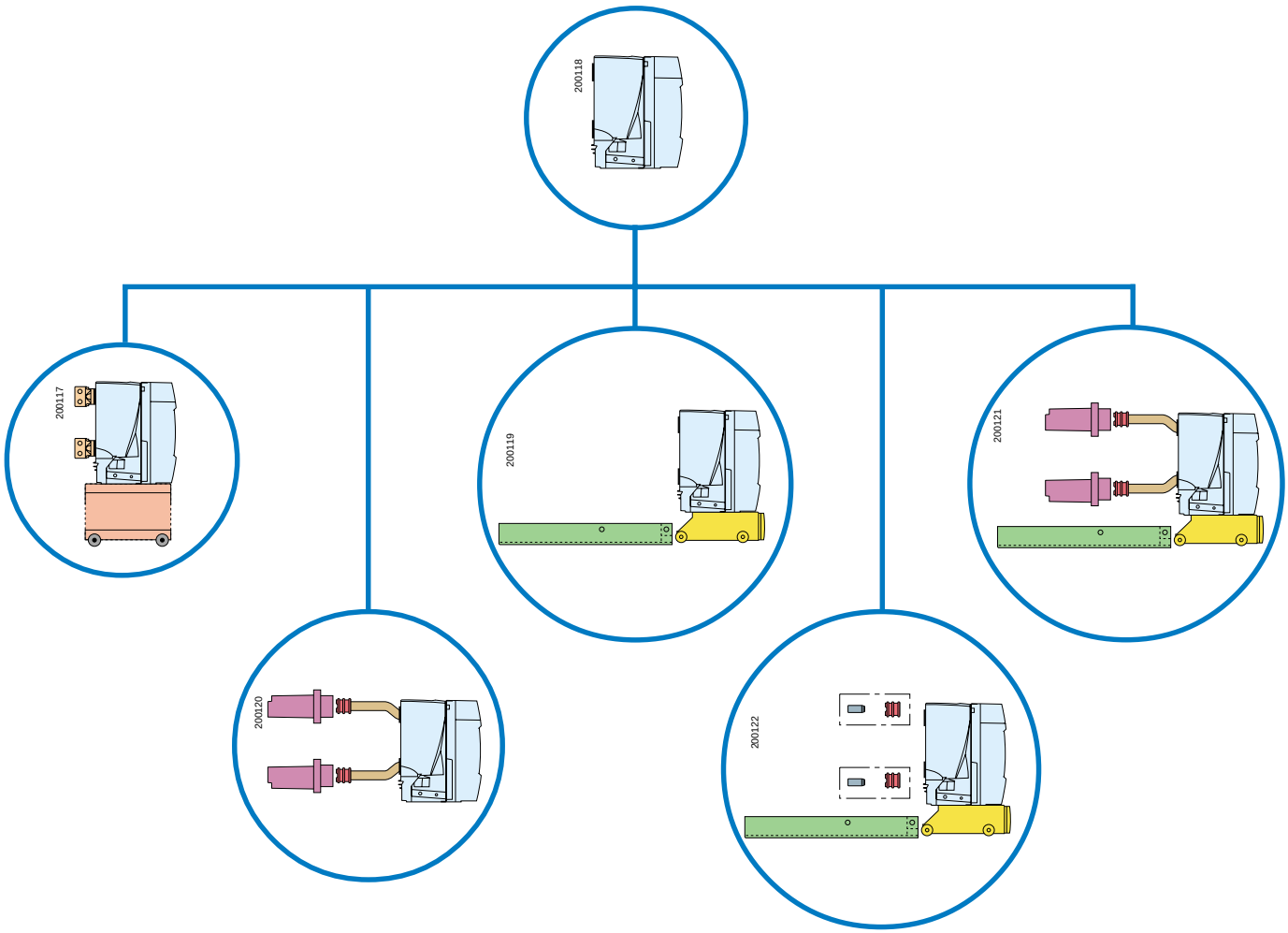
■ The circuit beaker is proposed in its **most simple configuration.**
In this case it can be combined with additional functions, to satisfy various requirements.

■ This version offers maximum flexibility to adapt to constraints in existing cubicles or to operating specifications:

□ retrofit: fixed and withdrawable installation
□ block-type cubicle or fenced sub-station: fixed or removable installation
□ compartmented cubicle: fixed and withdrawable installation.

■ The panel builder chooses the components he needs for a "customised" solution tailor made to his know-how.

Build your own version…



Evolis: the commitment of a major manufacturer

What guarantees does Evolis provide?

Conformity with standards

c Conformity with standards is a guarantee of suitability for the required function, the very basis of the contract between the supplier and the customer:
v dependability
v operator safety.
It allows specifications to be fully satisfied whilst complying with local contraints. During its design phase, Evolis was subjected to a series of tests which confirmed excellent performance levels, beyond the standards requirements.

c Type testing:
v dielectric tests
v temperature rise
v breaking capacity
v thermal withstand
v mechanical endurance
v electrical endurance.

c Specific testing:
v ageing
v transport and storage

N.B.:
IEC 60 694: common specifications for high voltage switchgear and controlgear standards
IEC 60 056: high voltage alternating current circuit breakers
IEC 60 298: A.C metal-enclosed switchgear between 1 kV and 52 kV.

***Comment**: for more information, consult the IEC organisation site: www.iec.ch.*

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Guaranteed quality

Schneider Electric integrates a functional organisation in each of its units with the main mission of checking quality and overseeing compliance with standards.

The quality system, for the design and manufacture of Evolis circuit breakers, is certified to be in conformity with the requirements of ISO 9001 and ISO 9002 quality assurance standards.

- **ISO 9001**: quality system for design/production and installation
- **ISO 9002**: quality system for production and installation
- **IQNET**: international certification network.

Systematic control

During manufacture, each circuit breaker is subjected to routine systematic testing, with the aim of checking both quality and conformity.

■ Control of vacuum interrupters

Each bulb, sealed and airtight, is checked for the quality of the vacuum obtained. This pressure measurement is based on the proven "magnetron discharge" method.
Using this sophisticated procedure, measurement is very precise and does not require access to the inside of the bulb, thus not affecting the airtight seal.

■ Control of the circuit breaker

A rigorous set of tests and measurements is carried out on each circuit breaker. The results obtained are reported on and signed off by the quality control department on the test certificate for each device, thereby guaranteeing product traceability.

Respecting the environment

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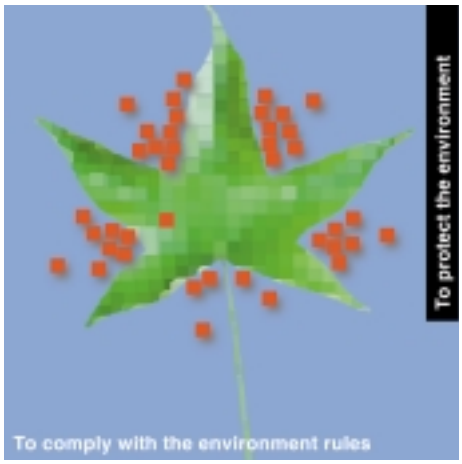

■ Schneider Electric sets itself the goal of

□ actively participating in environmental protection, from a circuit breaker's design right through to its end of life
□ complying with the environmental requirements of both its customers and end users of its products.

■ For Evolis circuit breakers

□ development teams integrated the product's end-of-life right from the design stage. The product is easy to dismantle, all the materials used are recyclable and non-polluting
□ plastic parts are marked to identify the material
□ the circuit breakers are produced in factories which respect the environment. Our subsidiary at Aubenas, France has been awarded the ISO 14001 standard certification (environmental management system).

Comment: *for more information, consult the ISO organisation site: www.ISO.CH*

Evolis: simplicity and rapidity

How Evolis makes your life easier?

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Choice

Evolis circuit breakers offer a comprehensive and rational range:
- 3 operating voltages (7.2 kV - 12 kV - 17.5 kV)
- 3 breaking capacities (25 kA - 31.5 kA - 40 kA)
- 4 current ratings (630 - 1250 - 1600 - 2500 A)
- 1 common range of accessories and auxiliaries
- 2 versions: complete and modular.

Ordering and delivery

- You can order
  - the cradle before the circuit breaker
  - a specific release unit, at the last moment, that you will easily be able to install yourself.

- Due to delayed locally implemented customising, you are delivered quicker.

Installation

Evolis is easy to incorporate in cubicles.
- 3 phase to phase distances (145 - 185 - 240 mm)
- Optimisation of volumes: one single height and depth throughout the range
- Electrical auxiliaries are interchangeable throughout the range
- Adjustable device height in the cubicle
- Variable phase to phase connection points.

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Evolis circuit breaker

Operation

Increased safety

Evolis has been designed and industrialised to provide maximum safety for operators whilst guaranteeing the simplicity and rapidity of operations.
- Protective metal shutters
- Safety interlocking systems to avoid operator errors when racking in or out
- Racking in/out possible with the door closed.

Reduced maintenance

- No preventive maintenance (lubricating, calibrating) before 10,000 switching cycles at the rated current
- Contact wear diagnosis is possible through a measurement on the pole unit
- Electrical auxiliairies are easily mounted on site (all you need is a screwdriver)
- Common stock of replacement parts with the **Masterpact** circuit breaker
- Diagnosis of the circuit breaker's functional chain using Sepam 1000+.

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Masterpact circuit breaker

From pre-engineering to switchboard composition, a "toolkit" exists for panel builders to highlight their know-how and optimise their work around Evolis.

Tools to partner your know-how

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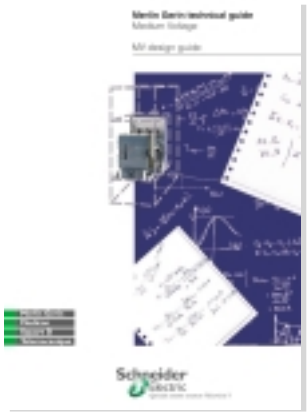

Design guide

This document provides you with all the technical recommendations you require for your calculations when designing cubicles and incorporating equipment in conformity with IEC standard 60 298.

E.g.:
- defining the switchgear
- dielectric strength
- busbar calculation
- temperature rise calculation
- definition of IP protection index.

Electronic catalogue

This "electronic" selection guide will rapidly become an everyday tool.
Several access points are proposed to discover the offer. It automatically provides the price of the device and an order form once you have selected your Evolis version.

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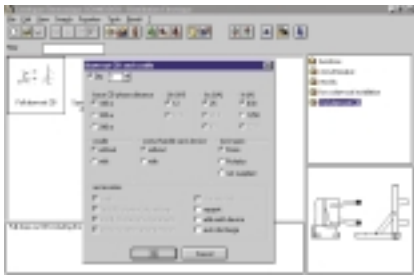

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Installation guide

This document provides you with all the information and recommendations you need to incorporate the circuit breaker and its accessories in a cubicle.

E.g.:
- dimensions and space requirements
- mechanical interface
- power circuit connection
- auxiliary connection
- layout diagrams.

AUTOCAD library

For easier and more reliable integration of Evolis in a cubicle environment, an extensive library of dimensional drawings and electrical layout diagrams is available in AUTOCAD format (format DXF/DWg/WMF).

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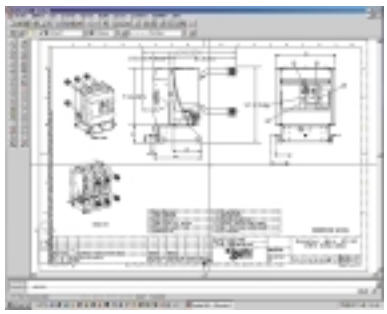

Internet site

Missing a certificate? Lost a technical manual?
Connect up to our web site where you can download all of our technical documentation.

This chapter provides useful information in selecting the performance levels of your Evolis circuit breaker.
It also describes all the functions associated to each versions.

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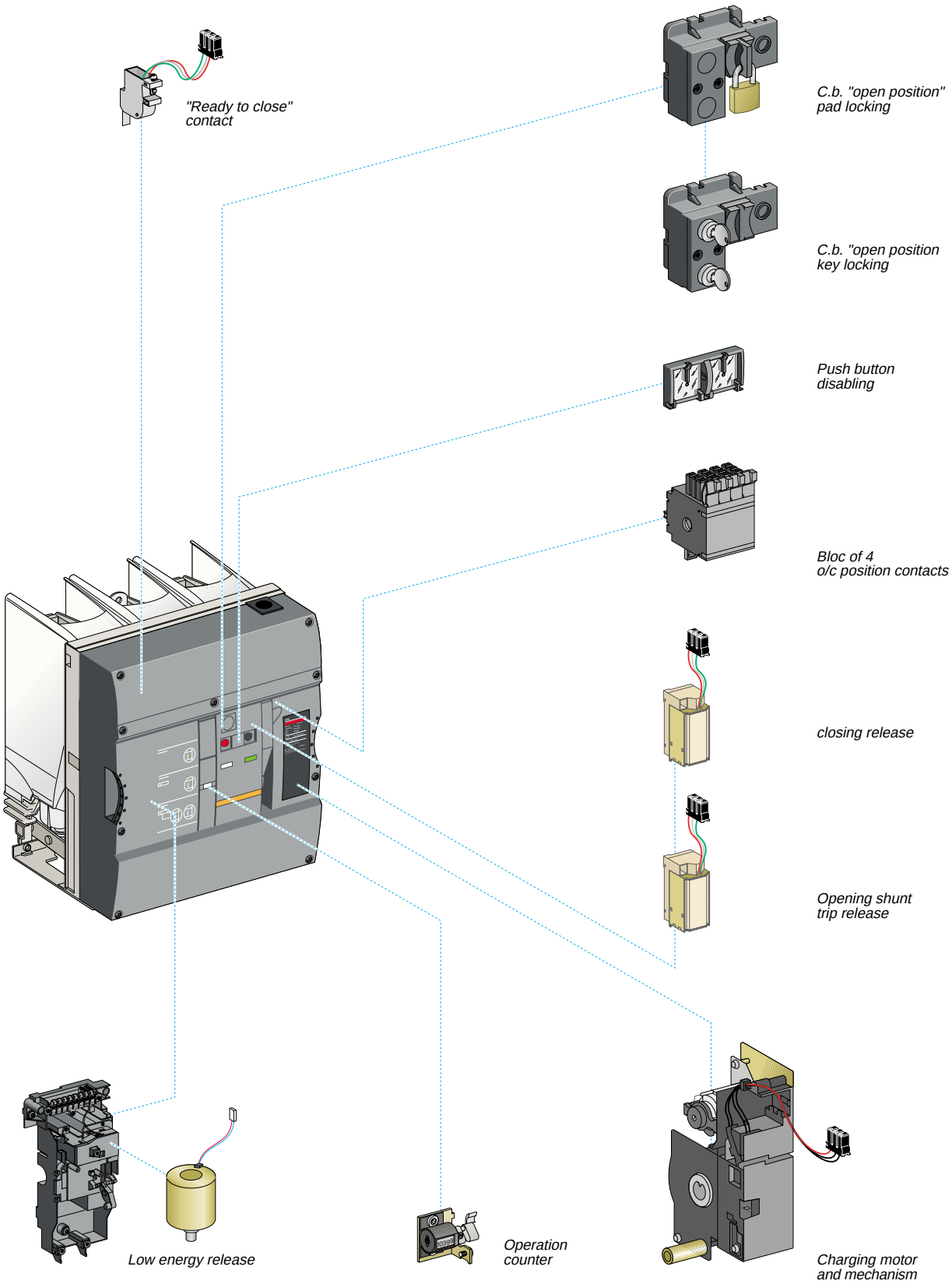
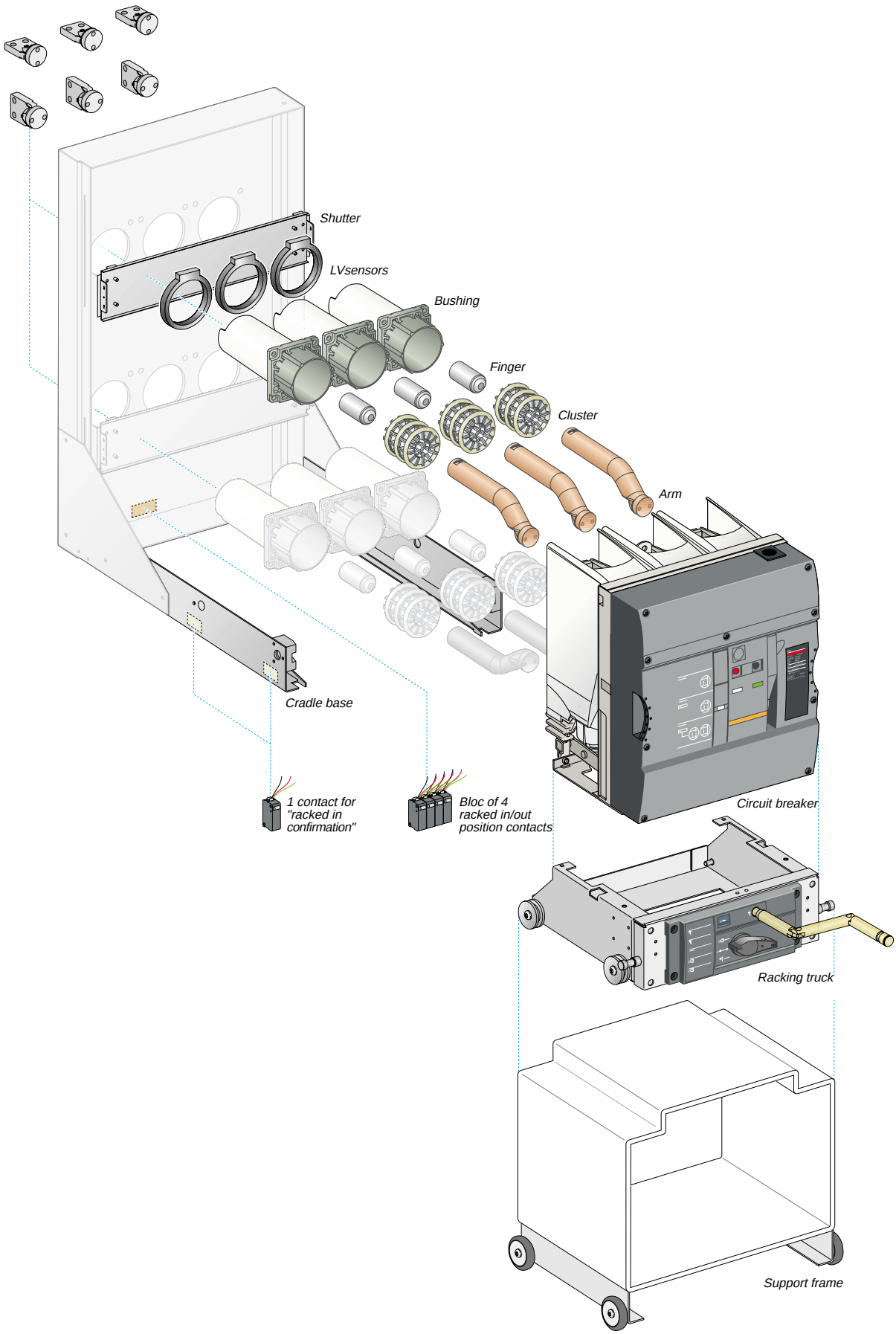
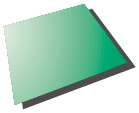

"Ready to close" contact
C.b. "open position" pad locking
C.b. "open position key locking
Push button disabling
Bloc of 4 o/c position contacts
closing release
Opening shunt trip release
Low energy release
Operation counter
Charging motor and mechanism

200175-E.eps

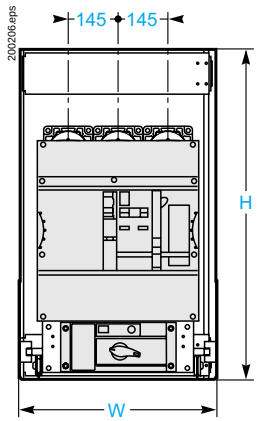

Shutter
LVsensors
Bushing
Finger
Cluster
Arm
Cradle base
1 contact for "racked in confirmation"
Bloc of 4 racked in/out position contacts
Circuit breaker
Racking truck
Support frame

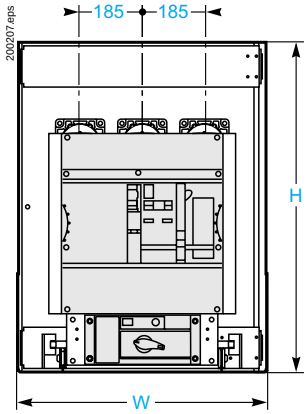


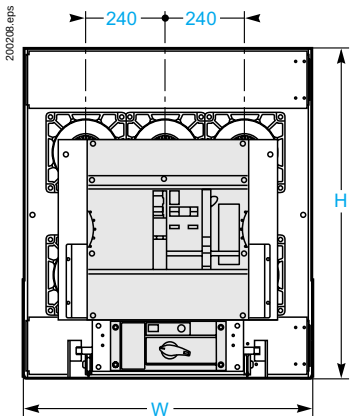
Performance tables
7P1 1250 to 17P3 2500

Common characteristics according to IEC 60 056				
rated frequency		**fr**	(Hz)	50 & 60
short-time withstand current		**Ik** for tk = 3 s	(kA) rms	Ik = Isc
rated peak withstand current		**Ip**	peak (kA)	Ip = 2.5 & 2.6 Ik
rated short circuit making current			peak (kA)	= 2.5 & 2.6 Isc
operating sequence				O - 3 mn - CO - 3 mn - CO
				O - 0.3 s - CO - 3 mn - CO
				O - 0.3 s - CO - 15 s - CO
operating times	opening		ms	< 50
	breaking		ms	< 60
	closing		ms	< 65
mechanical endurance	class			M2
	number of operations with maintenance			25000
electrical endurance	class			E2
	number of operations		25 kA	100
			31.5 kA	70
			40 kA	50
capacitive current braking				C1 class

Characteristics according to IEC 60 056			7P1-1250	7P2-1250	7P2-2500	7P3-2500	17P1-630	17P1-1250
rated voltage	**Ur**	(kV) rms	7.2	7.2	7.2	7.2	17.5	17.5
rated insulation level	**Ud**	(kV) rms	20	20	20	20	38	38
	Up	(kV) peak	60	60	60	60	95	95
rated short-circuit breaking current	**Isc**	(kA) rms	25	31.5	31.5	40	25	25
rated normal current (-25°C,+40°C)	**Ir**	(A) rms	1250	1250	2500	2500	630	1250
climatic version	-25°C + 40°C		■	■	■	■	■	■
Installation and connections								
phase distance between poles		(mm)	145 & 185	185	240	240	145 & 185	145 & 185
between MV connections on the cradle		(mm)	145…170 185…210	185…210	240…265	240…265	145…170 185…210	145…170 185…210
dimensions breaker and cradle (mm)		**Width** (W)	592 & 700	700	880	880	592 & 700	592 & 700
		Depth (D)	1140	1140	1140	1140	1140	1140
		Height (H)	960	960	960	960	960	960
mass breaker and cradle		(kg)	118 & 123	128	194	194	118 & 123	118 & 123







17P1-2500	17P2-630	17P2-1250	17P2-2500	17P3-1250	17P3-2500
17.5	17.5	17.5	17.5	17.5	17.5
38	38	38	38	38	38
95	95	95	95	95	95
25	31.5	31.5	31.5	40	40
2500	630	1250	2500	1250	2500
■	■	■	■	■	■
240	185	185	240	240	240
240…265	185…210	185…210	240…265	240…265	240…265
880	700	700	880	880	880
1140	1140	1140	1140	1140	1140
960	960	960	960	960	960
194	128	128	194	194	194

Power circuit

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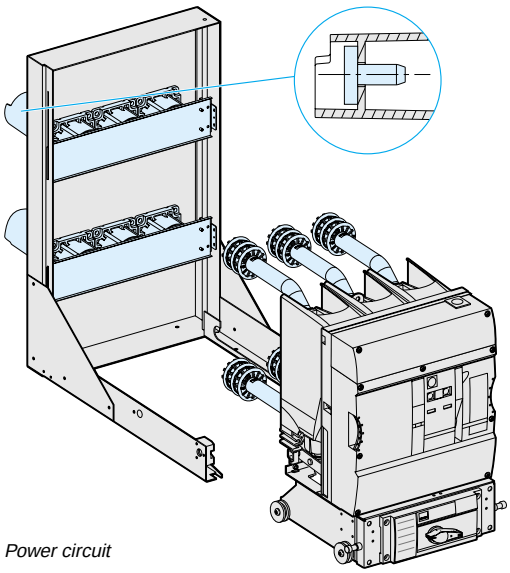

Power circuit

Composition

■ The power circuit comprises:

□ mobile contacts made up of disconnecting clusters and arms mounted on the circuit breaker

□ fingers located on the cradle and insulated by bushings and metal shutters.

■ This unit gives perfect control of dielectric and temperature rise considerations and has been validated by testing.

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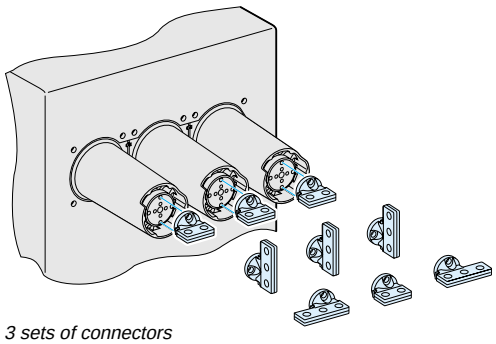

3 sets of connectors

■ Customer connection is easily achieved outside the cradle:

□ on vertical copper terminals integrated in the bushing

□ through a set of connectors, also used on the basic circuit breaker unit. Connection variants described on page 28 are possible.

Comments:

■ *The dielectric withstand values shown in the performance tables are guaranteed without the use of these connectors.*

■ *The panel builder should check the overall cubicle connection configuration; typical examples are given in the installation guide.*

Sensors

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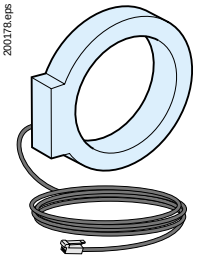

Sensor CVv120

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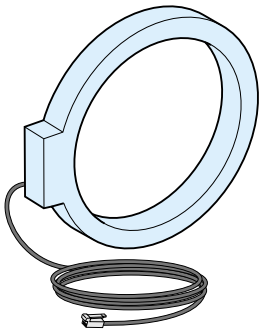

Sensor CVv200

Function

These low power sensors provide accurate current measurement to the protection function when the Evolis circuit breaker is associated with the Sepam1000+.

Composition

The sensor is delivered ready to be directly plugged to the Sepam unit.

Mechanical characteristics

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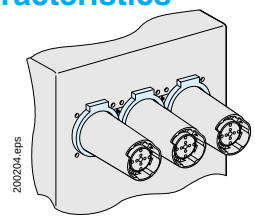


■ Mounted directly on the Evolis withdrawable circuit breaker cradle.
The sensors are simply located on the bushings and fixed using a screw.
Each sensor covers the full operating range of the corresponding circuit breaker.
■ Connection to the Sepam 1000+ is achieved using an armoured cable which is attached to each sensor.

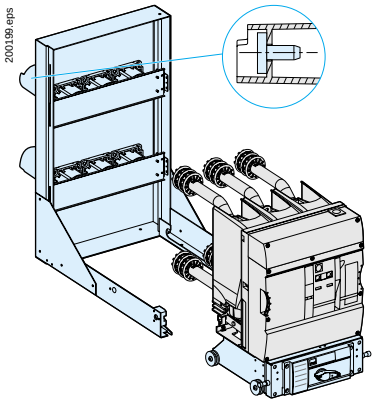
Electrical characteristics

■ In conformity with standard IEC 60044-8, defining voltage output current sensors
■ Usable for nominal currents of 25 A to 3150 A
■ Class 0.5 over the range 100 - 4000 A
■ The choice of sensor is solely based on the phase to phase distance of the cradle:
□ 120 mm diameter for phase to phase distances of 145 and 185 mm
□ 200 mm diameter for phase to phase distances of 240 mm
■ Current sensors deliver a voltage output at a ratio of 100 A / 22.5 mV.

Operation

An input terminal is provided on the Sepam 1000+ for testing and maintenance purposes. A test cabinet interface can be ordered to check the correct operation of sensors.

Racking in



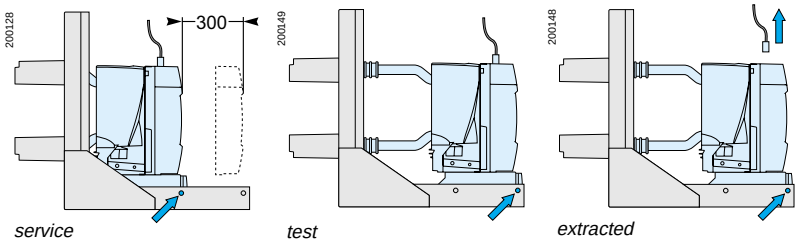
Composition

The "racking in" function is provided by:

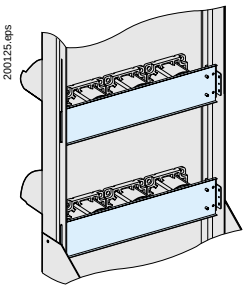
- The racking truck supporting the circuit breaker (mobile part).
- The cradle (fixed part).

Operating procedure

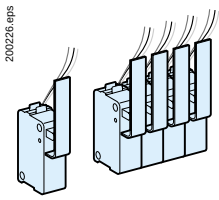
- The circuit breaker moves through 3 stable states:
  - service: circuit breaker racked in and locked in place; low voltage connected
  - test: circuit breaker racked out and locked in place; low voltage connected
  - extracted: the circuit breaker can be unlocked and extracted from the cubicle, with no interlocking.



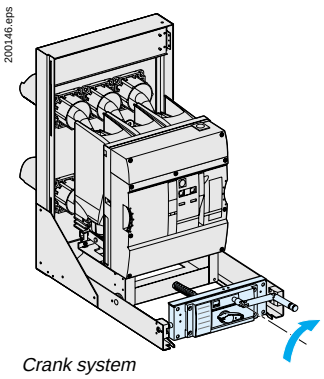
service *test* *extracted*



Shutters



Auxiliary contacts



Crank system

Functions

- Interlocking between circuit breaker control and cradle position makes operation safer: racking in or out only when the circuit breaker is open.
- Interlocking is also provided between the low voltage connector and the circuit breaker.

  Racking in is only possible when the low voltage connector is connected.
- Earthing is automatically achieved throughout the whole racking in operation.
- Protective shutters placed on the cradle, prevent access to the racking fingers when the device is extracted (protection index: IP2X).
- For maintenance operations, it is possible to:
  - padlock the shutters in the closed position.
  - unlock the shutters mechanism to access the racking fingers.
- An inter-cubicle fool-proof system avoid racking in by mistake a circuit breaker with a different I_n rating. This system is mounted on the racking base.
  Part of it has to be assembled by the panel builder on the cubicle floor.

Accessories

- A set of auxiliary contacts:
  - 4 racked in/racked out position contacts
  - 1 contact indicating that the cradle is locked in the racked in position.
- A propulsive system combined with a crank makes racking in and racking out easier. It allows the operation to be carried out with the door closed. Interlocking prevents to insert the crank until the racking base selector has been positioned to the "racked out" position.
- Additional earthing for the base can be provided by a copper brush.
- A key locking system (Ronis or Profalux) for the racked out position on the circuit breaker will provide increased safety when working downstream of the circuit breaker. This system is combined with an earthing disconnector *(refer to page 66)*.

Support frame

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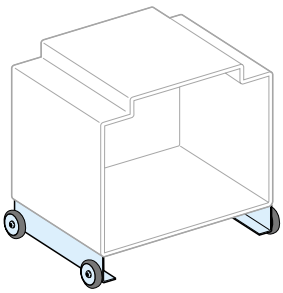


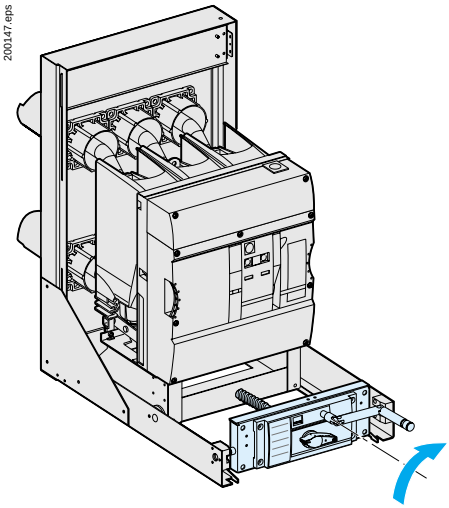
Support frame

Function

■ The support frame allows:

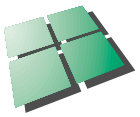
□ A "cassette" type circuit breaker to be transformed into a "roll on the floor" type circuit breaker by adding an intermediary structure
□ this structure can be positioned at a variable height according to your cubicle

200147.eps



Composition

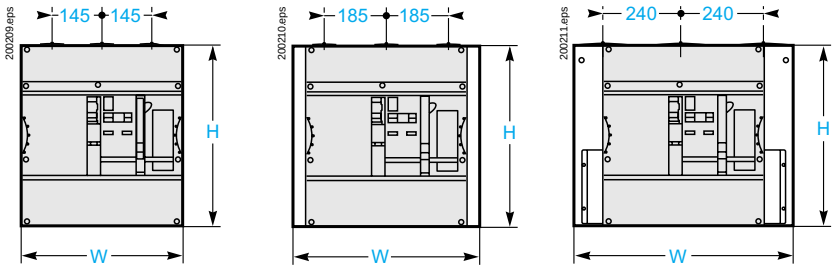
■ A roller kit will be provided with a drawing to allow the panel builder to adapt the height to its need inside his cubicle.



Performance tables
12P1 630 at 17P3 2500

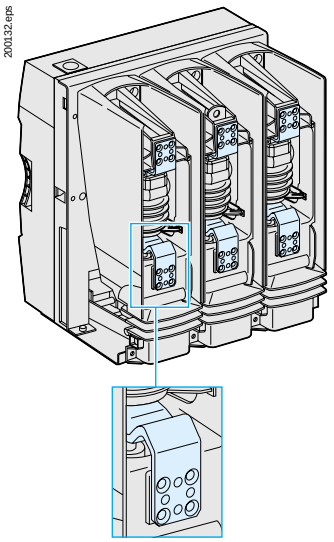
Common characteristics according to IEC 60 056			
rated frequency	**fr**	(Hz)	50 & 60
short-time withstand current	**Ik** for tk = 3 s	(kA) rms	Ik = Isc
rated peak withstand current	**Ip**	peak (kA)	Ip = 2.5 & 2.6 Ik
rated short circuit making current		peak (kA)	= 2.5 & 2.6 Isc
operating sequence			O - 3 mn - CO - 3 mn - CO
			O - 0.3 s - CO - 3 mn - CO
			O - 0.3 s - CO - 15 s - CO
operating times	opening	ms	< 50
	breaking	ms	< 60
	closing	ms	< 65
mechanical endurance	class		M2
	number of operations with maintenance		25000
electrical endurance	class		E2
	number of operations	25 kA	100
		31.5 kA	70
		40 kA	50
capacitive current breaking			C1 class

Characteristics according to IEC 60 056			7P1-1250	7P2-1250	7P2-2500	7P3-2500	17P1-630	17P1-1250
rated voltage	**Ur**	(kV) rms	7.2	7.2	7.2	7.2	17.5	17.5
rated insulation level	**Ud**	(kV) rms	20	20	20	20	38	38
	Up	(kV) peak	60	60	60	60	95	95
rated short-circuit breaking current	**Isc**	(kA) rms	25	31.5	31.5	40	25	25
rated normal current (-25°C,+40°C)	**Ir**	(A) rms	1250	1250	2500	2500	630	1250
climatic version	-25°C + 40°C		■	■	■	■	■	■
Installation and connections								
phase distance								
without MV connections		(mm)	145 & 185	185	240	240	145 & 185	145 & 185
with MV connections		(mm)	145…170	185…210	240…265	240…265	145…170	145…170
			185…210				185…210	185…210
dimensions (mm)		**Width** (W)	470 & 550	550	660	660	470 & 550	470 & 550
		Depth (D)	429	429	429	429	429	429
		Height (H)	530	530	530	530	530	530
mass		(kg)	50	50	70	70	50	50



17P1-1600	17P1-2500	17P2-630	17P2-1250	17P2-1600	17P2-2500	17P3-1250	17P3-2500
17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
38	38	38	38	38	38	38	38
95	95	95	95	95	95	95	95
25	25	31.5	31.5	31.5	31.5	40	40
1600	2500	630	1250	1600	2500	1250	2500
■	■	■	■	■	■	■	■
145 & 185	240	185	185	185	240	240	240
145…170 185…210	240…265	185…210	185…210	185…210	240…265	240…265	240…265
470 & 550	660	550	550	550	660	660	660
429	429	429	429	429	429	429	429
530	530	530	530	530	530	530	530
50	70	55	55	55	70	70	70

Connecting the power circuit



Terminal

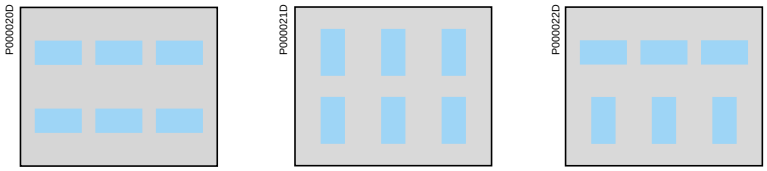
Composition

■ The basic circuit breaker unit is equipped with copper, drilled connection terminals, located at the top and bottom of the breaking poles

■ Connectors are mounted on these terminals using the associated bolt work. They enable several connection variants.
The same connectors can be also mounted on the bushing connection terminals (see page 22).

Fixed connectors

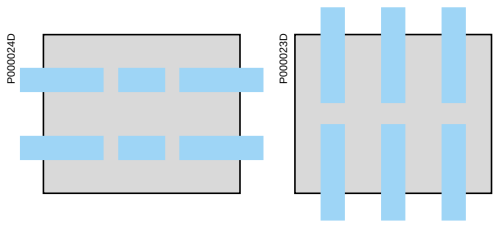
horizontal connectors (H) **vertical connectors (V)** **mixed connectors**



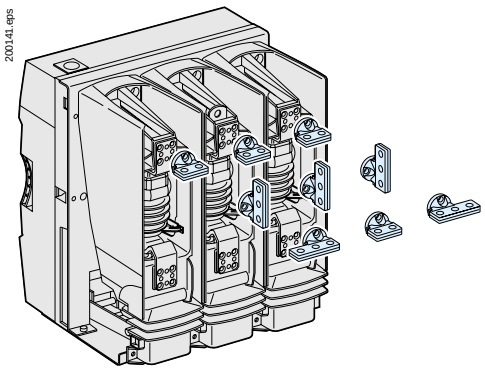
A horizontal connector becomes a vertical connector by a 90° rotation.

Variable distance connectors

horizontal spreading connectors (H) **vertical spreading connectors (V)**



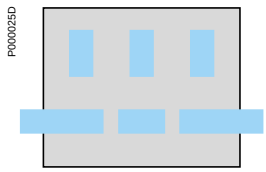
The spreading connector enables the connecting distance to be increased by 0 to 25 mm.



3 sets of connectors

Combined solution

example



Comments:

■ *The dielectric withstand values shown in the performance tables are guaranteed without the use of these Evolis connectors.*

■ *These connectors may be fitted with either bare copper, tin plated copper or tin plated aluminium conductors without any particular protection.*

■ *The dimensions and shapes of these conductors should be determined by the panel builder according to the required dielectric and temperature rise characteristics of the full connection system; typical examples are given in the installation guide.*

Power circuit

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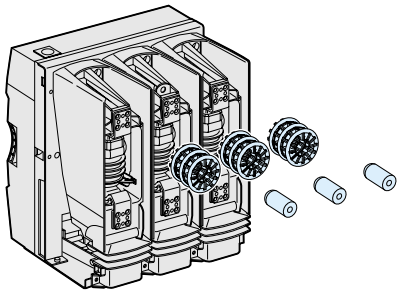


Cluster and finger

Composition

The panel builder produces the power circuit himself. He has the possibility of integrating one of these two highly technical units.

- Clusters and fingers
- Arms, clusters, fingers and bushings

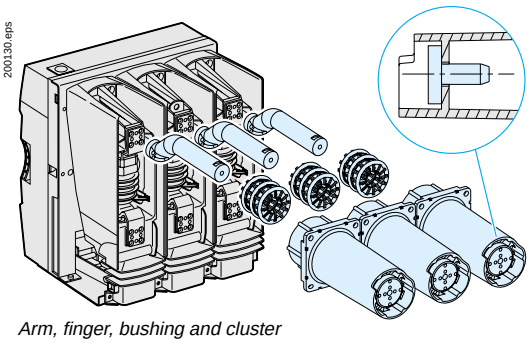
Cluster and finger

- The tulip type cluster has a shape which provides maximum contact surface whilst optimising heat dissipation. Moreover, in the case of short-circuit, it offers good compensation characteristics for electrodynamic forces.

Its degrees of freedom avoid the use of an interchangeability testing tool; a simple adjustment guide is all that is required.

- The finger is a component designed specifically for the cluster, regarding its shape, tolerances and materials. Contact between the finger and the cluster is guaranteed by type testing: 1000 racking in-out operations.

200130.eps



Arm, finger, bushing and cluster

Arm, cluster, finger and bushing

- The choice of a cylindrical shape for the arm optimises the dielectric withstand and eliminates the need for additional insulation.

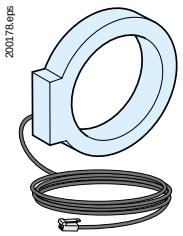
- The cylindrical shape of the bushing provides excellent dielectric withstand.

- It includes a connection terminal that can be fitted with the connectors described on page 22.

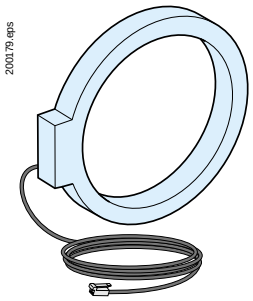
Comment:

- *Performances of the overall unit shall be controlled by the panel builder.*
- *Conditions of installation for both units described above are given in the installation guide.*

Sensors



Sensor CVv120



Sensor CVv200

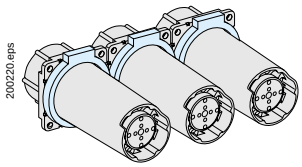
Function

These low power sensors provide accurate current measurement to the protection function when the Evolis circuit breaker is associated with the Sepam1000+.

Composition

The sensor is delivered ready to be directly plugged to the Sepam unit.

Mechanical characteristics



■ Mounted directly on the bushings.
The sensors are simply located on the bushings and fixed using a screw. Each sensor covers the full operating range of the corresponding circuit breaker.
■ Connection to the Sepam 1000+ is achieved using an armoured cable which is attached to each sensor.

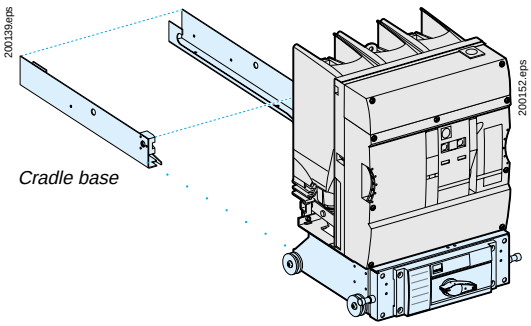
Electrical characteristics

■ In conformity with standard IEC 60044-8, defining voltage output current sensors
■ Usable for nominal currents of 25 A to 3150 A
■ Class 0.5 over the range 100 - 4000 A
■ The choice of sensor is solely based on the phase to phase distance of the cradle:
□ 120 mm diameter for phase to phase distances of 145 and 185 mm
□ 200 mm diameter for phase to phase distances of 240 mm
■ Current sensors deliver a voltage output at a ratio of 100 A / 22.5 mV.

Operation

An input terminal is provided on the Sepam 1000+ for testing and maintenance purposes. A test cabinet interface can be ordered to check the correct operation of sensors.

Racking in



Cradle base

Racking truck

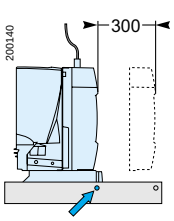
Composition

The "racking in" function is provided by:

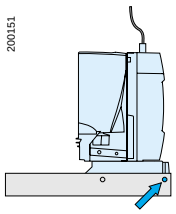
- The racking truck supporting the circuit breaker (mobile part).
- The cradle base (fixed part).

Operating procedure

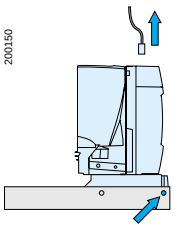
- The circuit breaker moves through 3 stable states:
  - service: circuit breaker racked in and locked in place; low voltage connected
  - test: circuit breaker racked out and locked in place; low voltage connected
  - extracted: the circuit breaker can be unlocked and extracted from the cubicle, with no interlocking.



Service position



Test position



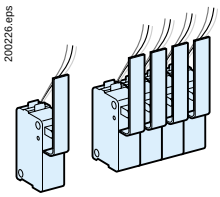
Extracted position

Functions

- Interlocking between circuit breaker control and cradle position makes operation safer: racking in or out only when the circuit breaker is open.
- Interlocking is also provided between the low voltage connector and the circuit breaker.

Racking in is only possible when the low voltage connector is connected.

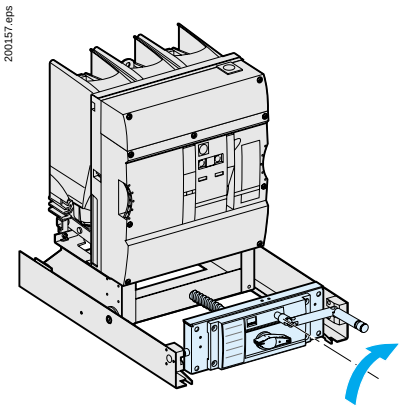
- Earthing is automatically achieved throughout the whole racking in operation.
- An inter-cubicle fool-proof system avoid racking by mistake in a circuit breaker with a different I_n rating. This system is mounted on the racking base. Part of it has to be assembled by the panel builder on the cubicle floor.



Auxiliary contacts

Accessories

- A set of auxiliary contacts:
  - 4 racked in/racked out position contacts
  - 1 contact indicating that the cradle is locked in the racked in position.
- A propulsive system combined with a crank makes racking in and racking out easier. It allows the operation to be carried out with the door closed. Interlocking prevents to insert the crank until the racking base selector has been positioned to the "racked out" position.
- Additional earthing for the base can be provided by a copper brush.
- A key locking system (Ronis or Profalux) for the racked out position on the circuit breaker will provide increased safety when working downstream of the circuit breaker. This system is combined with an earthing disconnector *(refer to page 66).*



Crank system

Support frame

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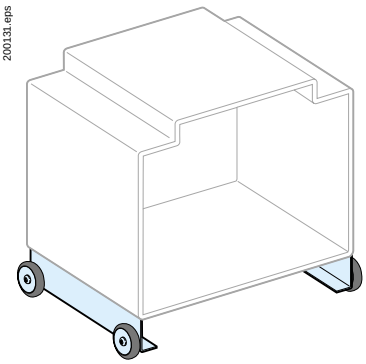


Support frame

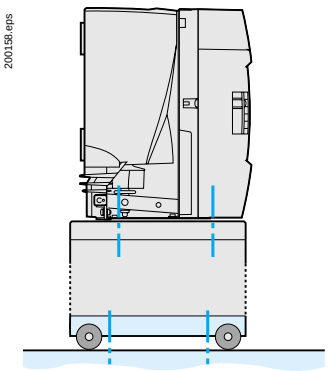
Function

Fixed installation

■ The support frame enables:

□ a fixing support to be produced for the circuit breaker. Fixing to the ground is achieved using a roller kit. A drawing enables the interface to be produced between the rolling channel and the circuit breaker.
□ the "roller" function to be provided using the integrated rollers.

200158.eps



Withdrawable installation

■ The support frame allows:

□ a "cassette" type circuit beaker to be transformed into a "roller" type circuit breaker by adding an intermediary structure
□ this structure to be positioned at a variable height according to the cubicle.

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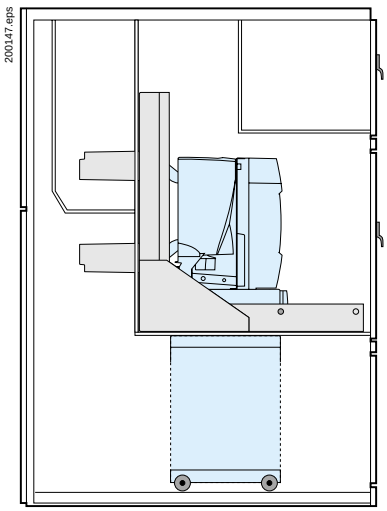
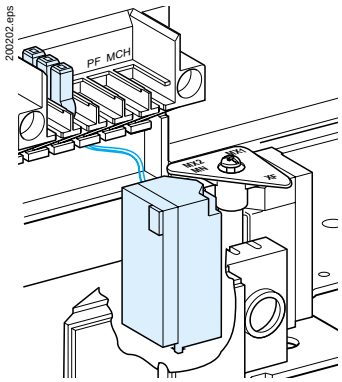


Opening circuit

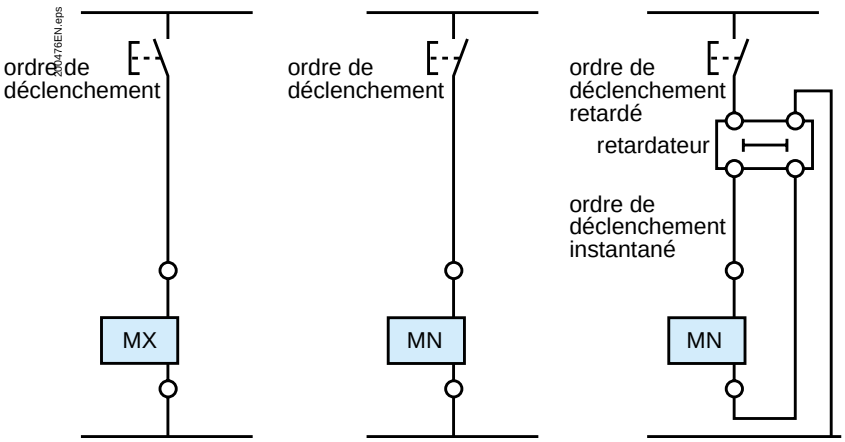


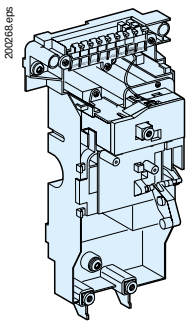
Circuit breaker equipped with an opening release

Composition

The basic circuit breaker equipment includes a shunt trip release unit (MX).
■ It may also include the following options:
□ a second MX release
□ **or** an under voltage shunt trip release (MN)
□ **or** an under voltage shunt trip release with time delay (MN + time delay unit)
□ **and** a low energy release (MITOP).

Opening mechanism circuit diagram





MITOP low energy release

Low energy release (MITOP)

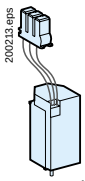
This specific coil actuates the opening mechanism of the poles to trip the circuit breaker. It comprises a low energy consumption electromagnet.

Characteristics	
supply	direct current
threshold	0.6 A < I < 3 A
response time of the circuit breaker at Un	11 ms

Any tripping caused by the Mitop release is indicated momentarily by an SDE type changeover contact. This Release Unit also includes a coil enabling the remote rearming of the SDE contact.

Comment
To use the MITOP release requires the adjustment of a time delay to be set by the protection relay in order to ensure a circuit breaker operating time of 45-50ms.

Opening circuit

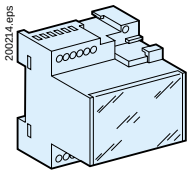


MN undervoltage release

Undervoltage shunt trip release (MN)

This release causes the instant opening of the circuit breaker when its supply voltage drops below a value of between 35 and 70% of its rated voltage. If the release is not energised, closing the circuit breaker (manually or electrically) is impossible. Any attempt to close causes no movement of the main contacts. Closing is authorised when the supply voltage of the release reaches 85% of its rated voltage.

Characteristics					
supply	V AC 50/60 Hz	24/30	48/60	100/130	200/250
	V DC	24/30	48/60	100/130	200/250
threshold	opening	0.35 to 0.7 Un			
	closing	0.85 Un			
consumption (VA or W)		20			
response time of the circuit breaker at Un		90 ms ± 5			

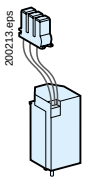


Time delay unit for MN

Time delay unit for MN

To eliminate spurious tripping of the circuit breaker during momentary voltage drops MN's action is time-delayed. This function is achieved by adding an external time delay to the MN release circuit (delay is ajustable).
This unit is placed outside of the circuit breaker and can be inhibited by an emergency stop button to obtain instant opening.

Characteristics					
supply	V CA 50/60 Hz		48/60	100/130	200/250
	V CC		48/60	100/130	200/250
threshold	opening	0.35 to 0.7 Un			
	closing	0.85 Un			
consumption (VA or W)		200			
response time of the circuit breaker at Un		0.5 s - 0.9 s - 1.5 s - 3 s			



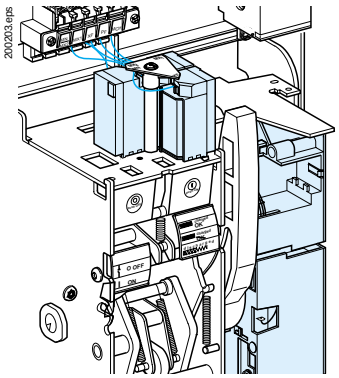
MX shunt trip release

Shunt trip release (MX)

This causes instant opening of the circuit breaker when energised.
Permanent energising of the MX locks the circuit breaker in the "open" position.

Characteristics					
supply	V CA 50/60 Hz	24/30	48/60	100/130	200/250
	V CC	24/30	48/60	100/130	200/250
threshold		0.7 to 1.1 Un			
consumption (VA or W)		pickup: 200			
		latched: 4.5			
response time of the circuit breaker at Un		50 ms ± 10			

Remote control

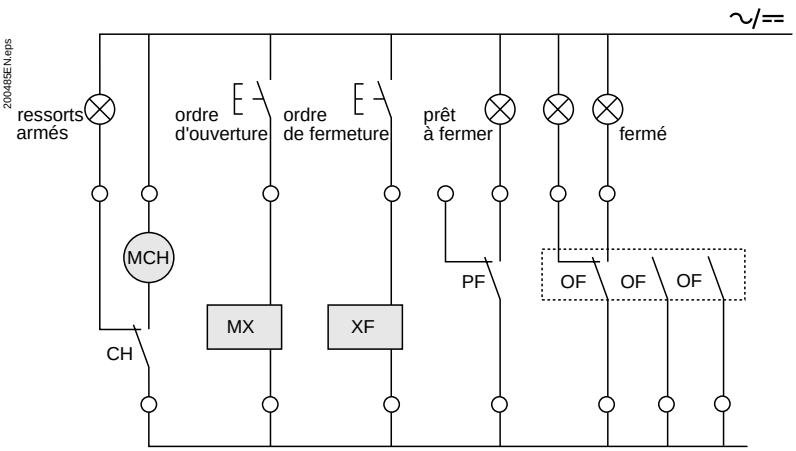


Circuit breaker equipped with remote control

Function

■ The remote control enables remote opening and closing of the circuit breaker.
■ In the case of continuous opening and closing orders, the remote control unit blocks the device in the open position as standard: **the anti-pumping function**. This function gives absolute priority to the opening order, but and also it stops closing and thus avoids the device being locked in an indefinite opening-closing cycle:
□ the opening and closing coils may be fed power on a constant basis to achieve an electrical type locking: there is no self-breaking contact inside the device.
□ the interlocking between the opening and closing orders, whatever their causes, is achieved as standard within the device's control mechanism.

Remote control circuit diagram

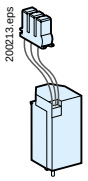


Composition

■ The remote control comprises:
□ charging motor and associated mechanism (MCH) equipped with a "spring-loaded" limit switch (CH)
□ two shunt trip releases:
- a closing release (XF)
- an opening release (MX).

■ It can be added to by:
□ a "ready to close" contact PF
□ a second block of 4 contacts for indication of the O/C position of the device.

Remote Control



Shunt trip release XF/MX

Charging motor and associated mechanism (MCH)

The MCH unit arms and rearms the energy storage springs as soon as the circuit breaker is closed. This enables instant reclosing of the device after opening.
The arming lever is only used as back up control in the absence of an auxiliary voltage.

The MCH is equipped as standard with a CH limit switch. This contact indicates the "armed" position of the mechanism (spring armed).

Characteristics					
supply	V AC 50/60 Hz		48/60	100/130	200/240
	V DC	24/30	48/60	100/125	200/250
threshold		0.85 to 1.1 Un			
consumption (VA or W)		180			
motor overcurrent		2 to 3 In during 0.1 s			
arming time		4 s. max.			
switching rate		3 cycles per minute max.			
mechanical endurance		10000 remote controlled opening operations for Evolis P1 and P2			
		5000 remote controlled opening operations for Evolis P3			
CH contact		10 A at 240 V			

Shunt trip Release (XF) and (MX)

Closing release (XF)
This causes the remote closing of the circuit breaker when the control mechanism is armed.

Opening release (MX)
This causes the instant opening of the circuit breaker when energised and can be permanently energised or temporarily energised.

XF characteristics					
supply	V AC 50/60 Hz	24/30	48/60	100/300	200/250
	V DC	24/30	48/60	100/130	200/250
threshold		0.85 to 1.1 Un			
consumption (VA or W)		pickup: 200			
		latched: 4.5			
response time of circuit breaker at Un		70 ms ± 10 for Evolis P1 and P2			
		80 ms ± 10 for Evolis P3			

MX Characteristics					
supply	V CA 50/60 Hz	24/30	48/60	100/300	200/250
	V CC	24/30	48/60	100/130	200/250
threshold		0.7 to1.1 Un			
consumption (VA orW)		pickup: 200			
		latched: 4.5			
response time of circuit breaker at Un		50 ms ± 10 ms			

Indication

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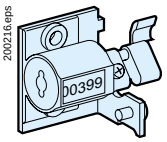

Operation counter

Operation counter (CDM)

The operation counter is visible from the front face. It totalises the number of switching cycles that the device performs.

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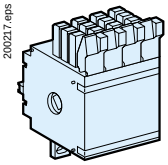

Rotary type O/C position contacts

"Open/closed" position contacts (OF)

These contacts indicate the "open" or "closed" position of the circuit breaker.

■ Rotary type change over contacts directly driven by the circuit breaker mechanism.

■ Indicator contacts proposed
□ in standard version for a relaying application
□ in low level version for control of plc's or electronic circuits. This version is compatible with the Sepam 1000+ unit.

Characteristics				
delivered as standard			3	
maximum quantity			11	
breaking capacity (A)	standard		min. load: 10 mA/24 V	
cos ø : 0.3	V AC	240/380	6	10/6
AC12/DC12		480	6	10/6
		690	6	6
	V DC	24/48	2.5	10/6
		125	0.5	10/6
		250	0.3	3
	low level		min. load: 1 mA/4 V	
	V AC	24/48		
		240	5	10/6
		380	5	3
	V DC	24/48	5/2.5	10/6
		125	0.5	10/6
		250	0.3	3

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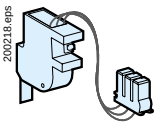


Ready to close contacts PF

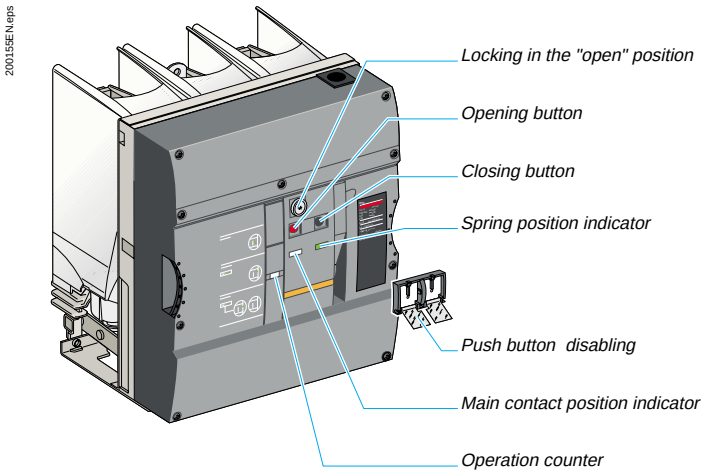
"Ready to close" contact (PF)

■ The "ready to close" position of the circuit breaker is indicated by a mechanical indicator and a changeover contact PF.

■ This information simultaneously indicates that:
□ the circuit breaker is open
□ the stored energy springs are armed
□ there is no permanent closing order
□ there is no permanent opening order:
- safety opening order (2nd MX or MN)
- device locked in the open position with a key lock.

Characteristics			
delivered as standard			0
max. quantity			1
breaking capacity (A)	standard		minimum load: 10 mA/24 V
cos φ : 0.3	V AC	240/380	5
AC12/DC12		480	5
		690	3
	V DC	24/48	3
		125	0.3
		250	0.15

Locking



Disarming the control springs

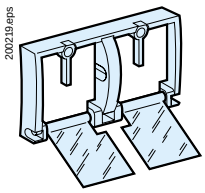
This feature guarantees operator safety when removing the circuit breaker front cover.

The auxiliary support located at the top of the control mechanism is then accessible when the springs are disarmed.

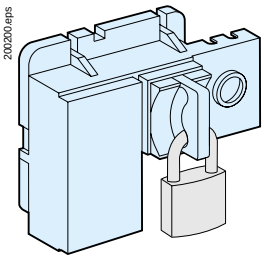
Push button disabling

This transparent screen prevents access to the circuit breaker opening and closing push buttons.
The device enables independent locking of the opening or closing button, it is often associated with an electrical motor (MCH).

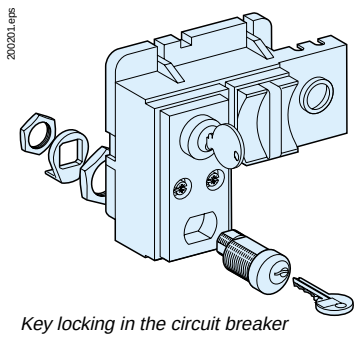
- Locking is achieved either by:
  - 2 screws
  - 3 padlocks, not supplied
  - sealing.



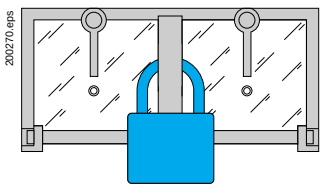
Push button disabling



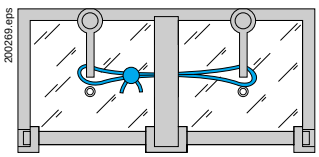
Padlocking in the circuit breaker "open" position



Key locking in the circuit breaker "open" position



Padlocking



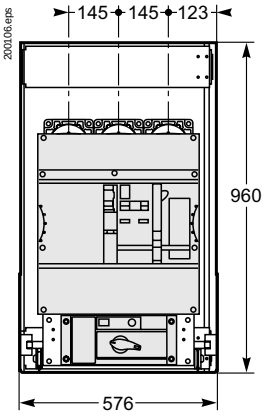
Sealing

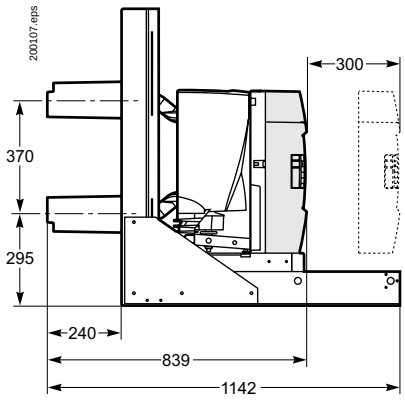
Locking of the circuit breaker in the "open" position.

- The circuit breaker is locked in the "open" position by blocking the opening push button in the "pushed-in position":
  - using padlocks: 1 to 3 padlocks not supplied
  - using key locks: 1 or 2 different key locks supplied.
- The key locks are of Profalux or Ronis type captive key, that becomes free once locked, and are offered according to the options, either:
  - 1 single key lock
  - 1 single key lock mounted on the device + 1 identical one delivered separately for interlocking with another device
  - 2 different key locks for double locking.
- Profalux and Ronis key locks are inter-compatible.

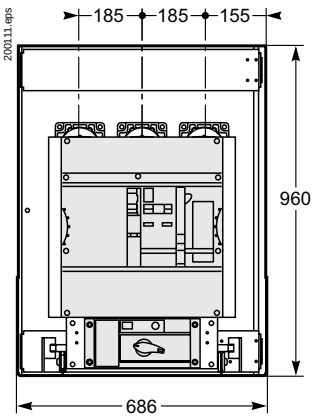
Full version

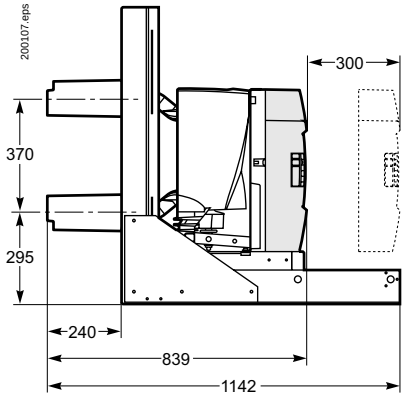
Circuit breakers:
7 P1 - 1250
17 P1 - 630
17 P1 - 1250



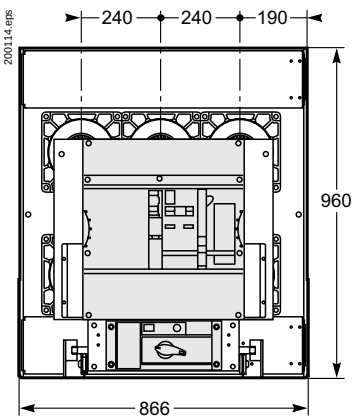


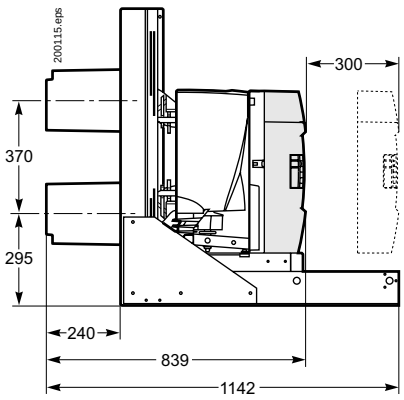
Circuit breakers:
7 P1 - 1250
7 P2 - 1250
17 P1 - 630
17 P1 - 1250
17 P2 - 630
17 P2 - 1250





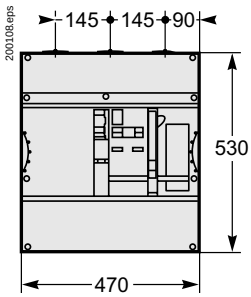
Circuit breakers:
7 P2- 2500
7 P3 - 2500
17 P1 - 2500
17 P2 - 2500
17 P3 - 1250
17 P3 - 2500

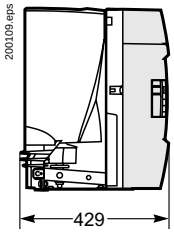




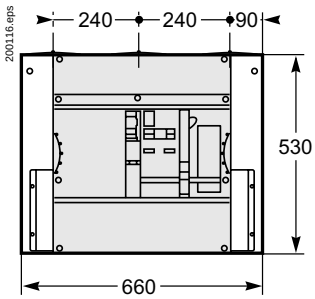
Modular version

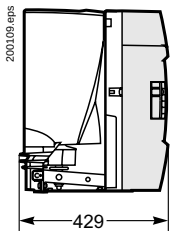
Circuit breakers:
7 P1- 1250
17 P1 - 630
17 P1 - 1250
17 P1 - 1600



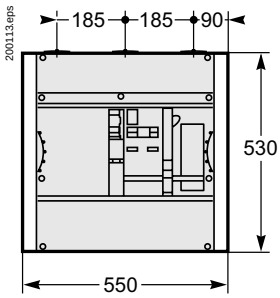


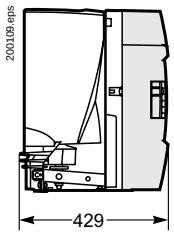
Circuit breakers:
7 P1- 1250
7 P2 - 1250
17 P1 - 630
17 P1 - 1250
17 P1 - 1600
17 P2 - 630
17 P2 - 1250
17 P2 - 1600





Circuit breakers:
7 P2- 2500
7 P3 - 2500
17 P1 - 2500
17 P2 - 2500
17 P3 - 1250
17 P3 - 2500





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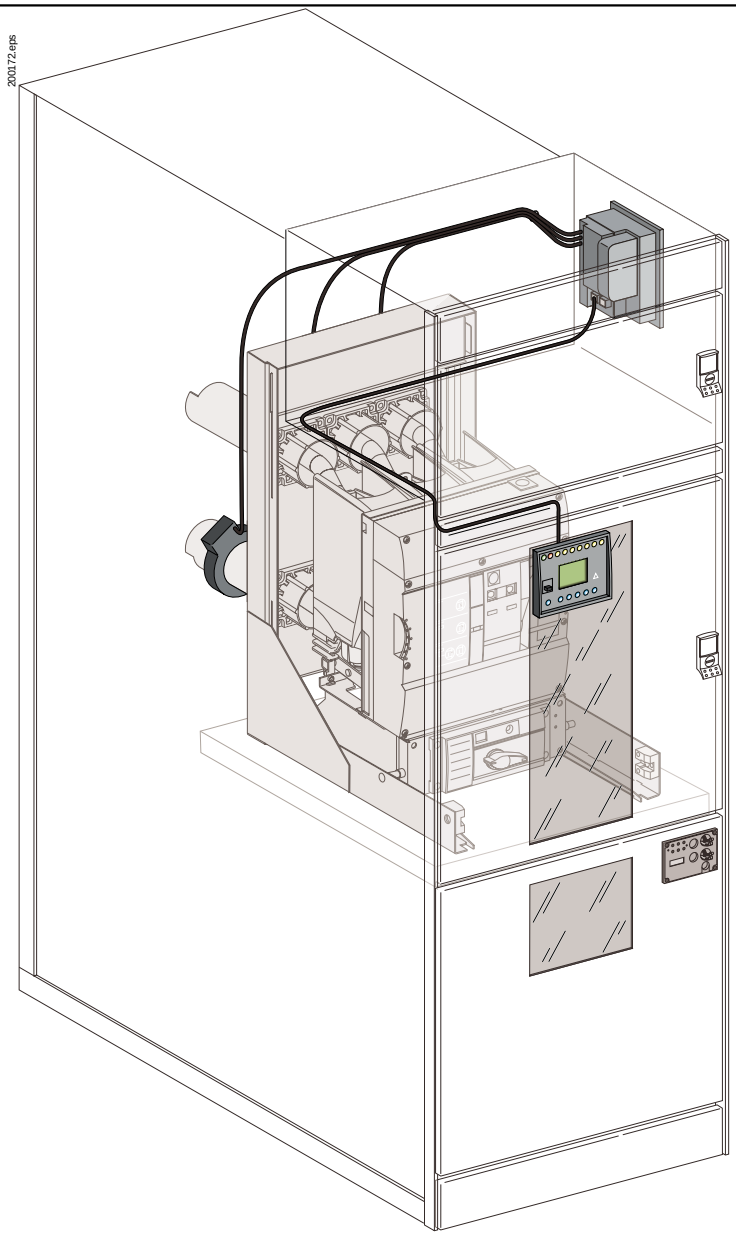
An integrated protection chain

The Sepam 1000+ protection unit combined with innovative current sensors, provides a full chain for metering, protection, monitoring and control.



■ A high performance and economical solution

□ Sepam 1000+, due to its modular offer, provides a cost-effective solution adapted to every requirement
□ one single reference of sensors covers a large range of currents, from 100 to 3150A.

■ Easy to order and install

□ all the components of the protection chain are referenced and deliverable very rapidly
□ the current sensors, developed in the circuit breaker environment are simply mounted onto the bushings,
□ the functioning of the protection chain integrated in the Evolis circuit breaker has been fully tested and certified.

■ The power of a multi-functional digital unit

Sepam 1000+ is not a simple protection relay, it is a multi-functional unit notably providing:
□ circuit breaker diagnosis functions (number of switching operations, operating time, charging time, cumulative breaking current)
□ direct circuit breaker control whatever type of release
□ remote operation of the equipment through the Modbus communication option.

An integrated protection chain

Sepam 1000 + *is a range of protection and metering units that is simple and reliable, intended to operate machines and electrical distribution networks in industrial installations and utility sub-stations.*

More solutions

Sepam 1000+ provides solutions adapted to each application providing an optimum cost/function ratio.
- Protection of sub-station incomers and feeders
- Protection of transformers
- Protection of motors
- Voltage protection for busbars.

More performances

Protections
- Protection against phase to phase and phase to earth short-circuits, with logic discrimination management
- Earth fault protection that is insensitive to transformer switching
- Detection of phase unbalance
- RMS thermal protection capable of taking account of ambient temperature and different ventilation configurations.

Communication

Fully compatible with the Modbus standard, it enables remote operation of equipment:
- Reading of all available information (measurements, logical states, settings, etc)
- Circuit breaker remote control.

Diagnosis
- Network diagnosis: trip currents, unbalance ratio, disturbance recording, etc.
- Circuit breaker diagnosis: number of switching operations, operating and charging time, cumulative A^2 broken, etc.
- Protection unit diagnosis: permanent self-testing, watchdog function, etc.

Monitoring and control

Circuit breaker control and indication logic programmed without auxiliary relays or additional cabling.

More modularity

- Optional modules can be easily added at any time:
  - logic inputs/outputs
  - communication
  - temperature sensor module
  - analogic output module.

More simplicity

Easy cubicle installation
- Compact basic unit, depth of less than 100 mm.
  - flush-mounted on the front panel
  - or mounted inside the control compartment, the user-machine interface (UMI) can then be placed in the best position for operation purposes.
- Low power consumption limiting the size of auxiliary supply batteries.

User-friendly
- All information is accessible on the advanced UMI
- Operator language of the advanced UMI can be customised
- Direct setting of real values using manufacturer's data
- Setting and operation software enabling the uploading and downloading of settings files amongst other things.

Sepam unit

2 Sepam units are available.
They can be distinguished by their type of user-machine interface (UMI)

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Unit with basic UMI

With the "basic" UMI

■ This basic unit offers a cost-effective response for:
□ installations not requiring local operation (control from a remote control and monitoring system)
□ replacement of electromechanical or analogic electronic protection devices.

■ Its UMI only includes:
□ 11 signal lamps
□ 1 "**reset**" key to clear faults and to reset
□ 1 connection port for the RS232 link with the PC.

Remote advanced UMI module (DSM 303)

■ Thinner and offering the functional features of the advanced UMI, it allows convenient installation on the front panel of the cubicle in the most effective position for operation.

■ This module is connected to the basic Sepam 1000+ unit using a prefabricated 2m (CCA 772) or 4m (CCA 774) cable.

■ A mounting plate is available to mount the basic Sepam 1000+ at the back of the cubicle control compartment (AMT 840).

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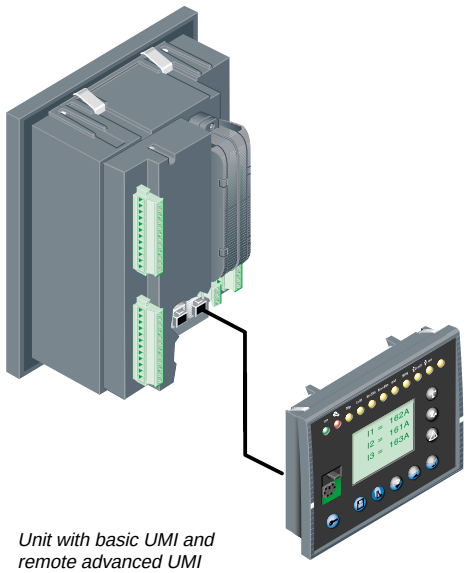

Unit with basic UMI and remote advanced UMI module

With the "advanced" UMI

This unit is an optimum response for local operation.

■ Its easy-to-read UMI includes:
□ **11 signal lamps**
□ **A "graphic" LCD display,** enabling display of metering values, parameter settings and alarm and operation messages
□ **a 9 key pad with 2 usage modes:**
- **white keys for current operation:**
displaying measurements, diagnosis information and alarms
- **blue keys for parameter and protection setting:**
Access to device parameters and protection settings. Modification protected by password
□ **1 connection port for the RS232 link with the PC.**

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Unit with advanced UMI

General characteristics

Supply voltage		
		range
	48 to 250 VDC and 110 to 240 VAC	-20/+10%
	24 VDC	-20/+50%
Operating conditions according to IEC 60 068		
	from -25°C to +70°C	
Operating language		
	English/French	
	English/Spanish	
	English/Italian	
	English/local language	

4 applications are available

Functions		Type of Sepam sub-station	transformer	motor	busbars
Protection	**ANSI Code**	**S20**	**T20**	**M20**	**B20**
phase overcurrent	50/51	■	■	■	
earth fault (or neutral)	50N/51N	■	■	■	
unbalance/negative sequence	46	■	■	■	
thermal overload	49 RMS		■	■	
phase undercurrent	37			■	
excessive starting time, locked rotor	48/51LR			■	
starts per hour	66			■	
undervoltage	27D/47				■
remanent undervoltage	27R				■
phase to phase undervoltage	27				■
phase to phase overvoltage	59				■
neutral voltage displacement	59N				■
overfrequency	81H				■
underfrequency	81L				■
recloser (4 cycles)	79	□			
thermostat / Buchholz			□		
temperature monitoring(2)	38/49T		□	□	
Metering					
phase current I1, I2, I3 RMS		■	■	■	
residual current Io		■	■	■	
average current I1, I2, I3		■	■	■	
peak demand line phase current IM1, IM2, IM3		■	■	■	
voltage U21, U32, U13					■
voltage V1, V2, V3					■
residual voltage Vo					■
positive sequence voltage Vd/rotation direction					■
frequency					■
temperature measurement(2)			□	□	
Network diagnosis					
tripping current I1, I2, I3, Io		■	■	■	
unbalance ratio / negative sequence current		■	■	■	
running hours counter			■	■	
termal capacity used			■	■	
operation duration remaining before overload tripping			■	■	
waiting time after overload tripping			■	■	
starting current and time				■	
start inhibit time delay, number of starts before inhibition				■	
disturbance recording		■	■	■	■
Switchgear diagnosis					
cumulative breaking current^2		■	■	■	
trip circuit supervision		□	□	□	□
number of operations		□	□	□	
operating time		□	□	□	
charging time		□	□	□	
Self-diagnosis					
watchdog		■	■	■	■
output relay test (3)		□	□	□	□
Control and monitoring					
circuit breaker / contactor control		□	□	□	□
logic discrimination		□	□	□	
4 addressable logical outputs		■	■	■	■
Additional modules					
8 temperature sensor inputs			□	□	
1 low-level analogue output		□	□	□	□
4 inputs/4 outputs or 10 inputs/4 outputs		□	□	□	□
RS485 communication interface		□	□	□	□

■ *basic,*
□ *according to parameter settings and input/output module options*
(2) *with probe option,*
(3) *with advanced MMI option.*

Protection and metering

Metering

■ Display of operational measurements on the UMI display.
■ This information can be obtained remotely:
□ by adding the **analogue output MSA 141** together with the factory-built cables
□ by adding the communication function.

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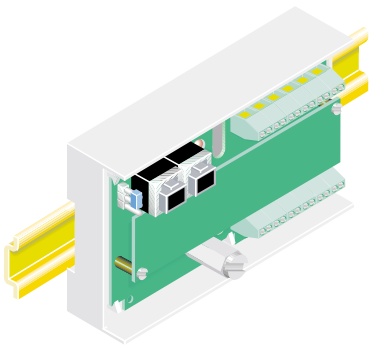

Temperature sensor input

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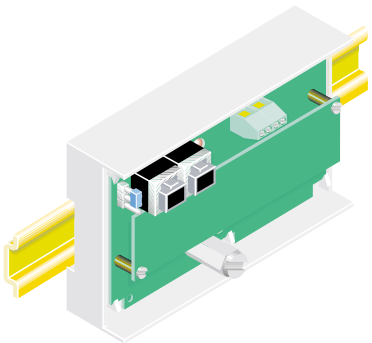

Analog output

Protection

Phase overcurrent (ANSI 50/51)
4 three-phase protection functions against faults, set independently.
■ Adjustable timer hold, for detection of restriking faults.
■ Switching function between 2 sets of settings.

Earth fault (ANSI 50N/51N or 50G/51G)
4 protection functions against earth faults, set independently.
■ Adjustable timer hold time, for detection of restrike faults.
■ 2nd harmonic restraint, for stability on transformer closing.
■ Switching function between 2 sets of settings.

Unbalance / negative sequence (ANSI 46)
Protection against phase unbalance.

Thermal overload (ANSI 49)
■ 2 protection functions against thermal damage due to an overload, to take account of:
□ changes in ventilation state of transformers
□ start-up and reacceleration phases of motors
■ The calculation of equipment heat rise takes account of:
□ the RMS value of currents and the negative sequence current
□ ambient temperature
□ heating and cooling curves.
■ Each function includes 2 thresholds:
□ 1 adjustable threshold for tripping
□ 1 adjustable threshold for alarm.

Phase undercurrent (ANSI 37)
Protection of pump motors against working with no load, pump not primed.

Excessive starting time / locked rotor (ANSI 48/51LR)
■ Checking the duration of motor starting time.
■ Detecting locked rotor in steady state.

Start per hour (ANSI 66)
Blocking motor start-up in the case of too frequent start-ups, to avoid temperature rise.

Recloser (ANSI 79)
Automatic control to reclose a circuit breaker after tripping on a spurious fault on a line (4 reclosing cycles can be set).

Thermostat, Buchholz
Protection of transformers against internal faults detected by integrated devices.

Temperature monitoring (ANSI 38/49T)
Protection of transformers and motors equipped with temperature sensors.
1 alarm threshold and 1 tripping threshold on each of 8 temperatures measured by sensors.
■ This protection requires the 8 inputs MET 148 module
■ The module is connected to the Sepam unit by a cable of length 0.6 m, 2 m, or 4 m (CCA 770 - CCA 772 - CCA 774).

Overvoltage (ANSI 59) and Undervoltage (ANSI 27)
2 protection functions against variations in nominal voltage, to monitor quality of power supply. Can be used for automatic functions (transfer, load shedding).

Positive sequence undervoltage (ANSI 27D/47)
■ Protection of motors against incorrect operation due to insufficient or unbalanced voltage.
■ Detection of phase rotation .

Remanent undervoltage (ANSI 27R)
Monitoring the disappearance of remanent voltages provided by rotating machine after circuit opening.

Neutal voltage displacement (ANSI 59N)
2 protection functions against earth faults on an isolated network, by measurement of neutral voltage displacement.

Overfrequency (ANSI 81 H) and underfrequency (ANSI 81 L)
Detection of variances with respect to the rated frequency, to monitor the quality of supply.

Setting ranges

Functions	Settings		Time delays	
Phase overcurrent (1)				
rated current (In)	1 A to 6 250 A			
curve	DT, SIT, VIT, LTI, EIT, UIT, RI			
definite time	0.3 to 24 In		Inst; 0.05 s to 300 s	
IDMT	0.3 to 2.4 In		0.1 s to 12.5 s at 10 Is	
Earth fault (1)		**type of sensor**		
rated current (Ino)	1 A to 6 250 A			
curve	DT, SIT, VIT, LTI, EIT, UIT, RI			
definite time	0.1 to 15 Ino	Σ 3I ph	Inst; 0.05 s at 300 s	
	0.2 to 30 A	CSH cal 2 A		
	2 to 300 A	CSH cal 20 A		
	0.1 to 15 Ino	CT 1 / 5 A or zero sequence core balance CT (2)		
IDMT	0.1 to 1 Ino	Σ 3I ph	0.1 s to 12.5 s at 10 Iso	
	0.2 to 2 A	CSH 2 A rating		
	2 to 20 A	CSH 20 A rating		
	0.1 to 1 Ino	CT 1 / 5 A or core balance CT (2)		
Negative sequence unbalance				
definite time	0.1 to 5 Ib		0.1 s to 300 s	
IDMT	0.1 to 0.5 Ib		0.1 s to 1 s	
Thermal overload			**rate 1**	**rate 2**
	negative sequence factor	0 - 2.25 - 4.5 - 9		
	time constant	heat rise	T1: 5 to 120 mn	T1: 5 to 120 mn
		cooling	T2: 5 to 600 mn	T2: 5 to 600 mn
	alarm; tripping	50 to 300% of rated thermal capacity used		
	cold curve change factor	0 to 100%		
	rate change condition	by IS setting 0.25 to 8 Ib (motor)		
		by logic input I26 (transformer)		
	max. equipment temperature	60 to 200°C		
Phase undercurrent				
	0.15 to 1 Ib		0.05 s to 300 s	
Excessive starting time / locked rotor				
	0.5 Ib to 5 Ib	ST start time LT time delay	0.5 s to 300 s 0.05 s to 300 s	
Starts per hour				
	1 to 60 start-ups per period	period		
	1 to 60 successive start-ups	inter-start-up T	1 to 90 min	
Temperature (sensors)				
2 thresholds / sensor	0 to 180°C (or 32 to 356°F)			
Overvoltage				
2 thresholds	50 to 150% Unp		0.05 s to 300 s	
Undervoltage				
2 thresholds	5 to 100% Unp		0.05 s to 300 s	
Positive sequence undervoltage				
2 thresholds	30 to 100% Vnp (Unp/$\sqrt{3}$)		0.05 s to 300 s	
Remanent undervoltage				
1 threshold	5 to 100% Unp		0.05 s to 300 s	
Neutral voltage displacement				
1 threshold	2 to 80% Unp		0.05 s to 300 s	
Overfrequency				
1 threshold	50 to 53 Hz or 60 to 63 Hz		0.05 s to 300 s	
Underfrequency				
2 thresholds	45 to 50 Hz or 55 to 60 Hz		0.05 s to 300 s	

Reminder:
The current In, the rated voltage Unp and the current Ino are general settings that are set when commissioning Sepam 1000+.
They are expressed in terms of values at the primary of metering transformers.
***In** is the rated current of current sensors (CT rating) (adjustable from 1A to 6250 A).*
***Unp** is the rated phase to phase voltage of the voltage sensor primary (adjustable from 220 V to 250 kV).*
***Ino** is the rating of the residual current sensors.*
***Ib** is the current corresponding to the equipment's rated power, adjustable from 0.4 to 1.3 In.*

The setting of current, voltage and frequency values is carried out by directly inputting the value; (resolution: 1A, 1V, 0.1 hz, 1°C or F).
(1) adjustable timerhold define time 0.05 to 300s.
(2) with adapter core balance CT ACE 990 for core balance CT with a ratio of n between 50 and 1500 turns.

Sensors

2 types of sensors can be connected to Sepam 1000+ to measure current:

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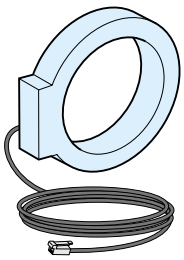

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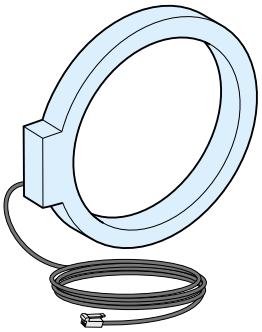

Low power current sensors

Low power current sensors

These are part of the integrated protection chain associated with Sepam 1000+ and the Evolis circuit breaker providing current measurement.

Function

These low power current sensors measure current to provide the protection function when associated with Sepam 1000+ and the Evolis circuit breaker.

Composition

The sensor is delivered with 5 m of cable and a connector that allows direct connection to the Sepam unit.

Mechanical characteristics

■ Mounted directly on the Evolis withdrawable circuit breaker chassis.
The sensors are simply positioned by being fitted over the bushings and attached using a screw. Each sensor covers the full operating range of the corresponding circuit breaker.

■ Connection to Sepam 1000+ using the shielded cable and connector supplied with the sensor.

Electrical characteristics

■ In conformity with IEC standard 60044-8, defining voltage output current sensors
■ Usable for rated currents of between 100 A and 3150 A
■ Class 0.5
■ The choice of sensor is based solely on the phase-phase distance of the chassis:
□ diameter 120 mm for phase-phase distances of between 145 and 185 mm
□ diameter 200 mm phase-phase distances of 240 mm
■ Current sensors are voltage output measurement adapters with a ratio of 100 A / 22.5 mV.

Operation

An input terminal is available on the Sepam 1000+ unit for testing and maintenance operations. A test equipment interface can be order to check the correct operation of sensors (ACE 917).

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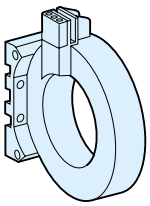


Zero sequence core balance CT's

Zero sequence core balance CT's

These enable direct measurement of residual current.

Electrical characteristics

■ Maximum permissible current: 20 kA/1 s
■ Transformation ratio: 1/470
■ Accuracy: ± 5% 0 20°C
■ Rating of 2 A input: adjustable threshold from 0.2A to 30 A
■ Rating of 20 A input: adjustable threshold from 2A to 300 A.

Mechanical characteristics

■ they are mounted on the Medium Voltage cables

■ Several versions are available according to the internal diameter:
□ 120 mm CSH 120
□ 200 mm CSH 200.

■ An adapter is available to connect core balance CT's with ratios of between 50 and 1500 turns or current transformers to be supplied by the panel builder.

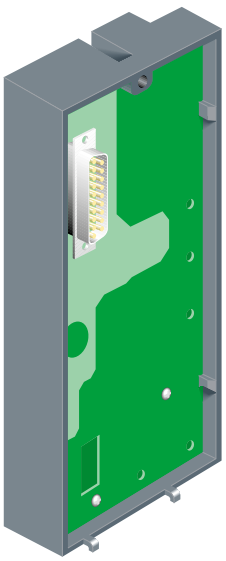
Other compatible sensors

■ Sepam 1000+ also functions with 1 A/5 A current and voltage sensors to be provided by the panel builder.

■ Sepam 1000+ B20 functions with voltage transformers (primary voltage from 220V to 250 kV), to be provided by the panel builder.

■ Connection is carried out using a connector which can be unplugged when energised:
□ CCA 630 for current transformers
□ CCT 640 for voltage transformers.

Monitoring and control



Composition

The basic Sepam 1000+ unit has 4 relay outputs.
■ The extension of input/output resources for Sepam 1000+ uses an additional module, available in 2 versions:
□ 4 logic inputs/4 relay outputs: MES 108
□ 10 logic inputs/4 relay outputs: MES 114.
This module is installed on the rear panel of the basic unit.

Functions

The availability of the following functions depends on the type of Sepam 1000+ unit and on its logic input/output resources.

Circuit breaker control

■ Opening, closing and inhibit closing (ANSI 69) of circuit breaker equipped with undervoltage release coil or shunt trip coil logic discrimination according to information:
□ from the protection functions and the re-closer
□ from remote control system
□ from switchgear diagnosis.

Position contacts discrepancy (SSL) (ANSI 68)

Quick and selective tripping of phase overcurrent protection and earth fault protection by logical blocking of upstream protection by the downstream protection. A safeguard device ensures the functioning of the protection device in the case of failure of the blocking link.

Latching / acknowledgement (ANSI 86)

Latching of output relays can be set. The latched closing orders are stored in memory and must be acknowledged before the device is put back in service.

Annunciation (ANSI 30)

■ Alarms detected and indicated:
□ by lights on the front panel
□ by messages on the display
□ by relay outputs according to parameter settings
□ remotely by the communication interface.

Watchdog

Output relay testing

Characteristics

Logic inputs

■ Independent inputs, free of voltage.
■ Direct input voltage: 24 to 250 Vdc.
■ Consumption: 3 mA typically.

Relay outputs

■ Direct or alternating voltage: 24 to 220 Vdc and 100 Vac at 240 Vac.
■ 3 control outputs: continuous rating 8 A.
■ 5 indication outputs: continuous rating 2 A.

Communication

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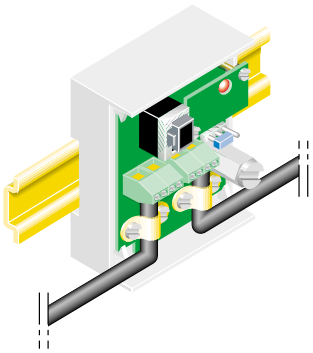

Communication interface

Function

Via the remote control and monitoring system, this allows the remote operation of equipment, with a Modbus protocol.

Remote monitoring by reading data

- Metering
- Value of protection settings
- Status of protections and Sepam 1000+ functions
- Status of "logic" inputs
- Time tagged events
- Disturbance recordings.

Remote control

- Opening and closing of the switchgear from the supervisor workstation
- Activating of Sepam 1000+ functions
- Two modes are available:
  - "direct" or
  - "select before operate".

Remote setting of protections

Characteristics

Type of transmission	asynchronous serial
Protocol	Modbus slave
Rate	4800, 9600, 19200, 38400 bauds
Electrical interface	2 wire differential, standard EIA RS 485
Maximum distance	250 m
Number of bus supplied Sepam units on one line	25
Number of masters	1
Response time	less than 15 ms

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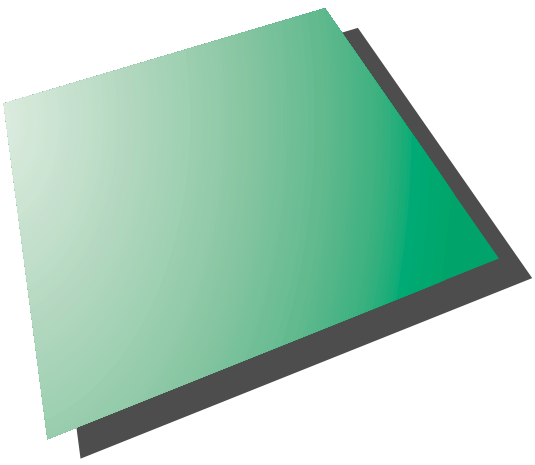
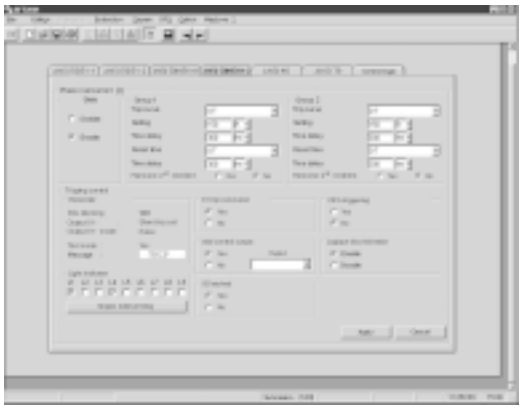


Network example

Setting up the Modbus network

- This is achieved by connecting:
  - the communication interface module ACE 949 to the Sepam 1000+ via its connection cable of length 3 m (CCA 612)
  - RS 485 / RS 232 (ACE 909-2) or RS 485 / RS 485 (ACE 919) converter. Amongst other things this provides power to the interface module. A maximum of 25 modules can be connected to it
  - cabling between these elements must be provided with a shielded cable which is not supplied including 2 twisted pairs.

Software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Expert User Machine Interface Software

The SFT2841 software gives access to all Sepam 1000+ functions, with all the user friendliness and comfort offered by a Windows type environment.

Operation

■ 2 modes are available:
□ not connected to Sepam 1000+ for initial preparation of parameters and protection settings
□ connected to Sepam 1000+, to get optimum use of its resources and have all the functions available in disconnected mode and additional local operation functions.

Parameter and protection settings

The creation of files containing all parameters and protection settings for Sepam 1000+ is possible without being connected to the unit.

■ Amongst other things the software enables:
□ the full setting of Sepam 1000+ and adjustment of protection functions
□ customising of the control logic
□ customising of identification labels for lsignal lamps
□ management of parameters and settings files: saving, comparison, printing

Local operation

■ Connected, the software enables access to the following information:
□ all metering and diagnosis values
□ parameters and settings protection
□ past history of alarms with time of occurrence
□ logical states of inputs, outputs and signal lamps
■ And the following operations:
□ uploading and downloading parameters and settings files
□ recovery and saving of disturbance recordings
□ acknowledgement of active alarms and resetting of Sepam 1000+ after tripping.

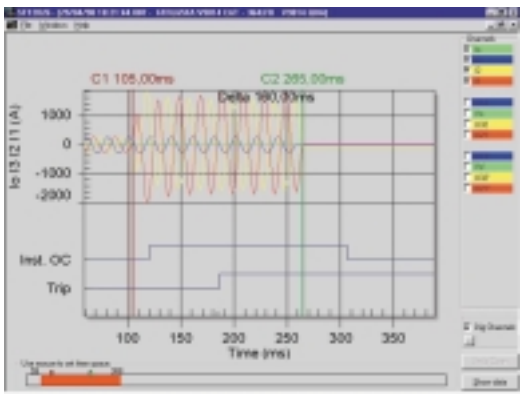
Implementing

■ **Required configuration**
□ Microsoft Windows 95/98/NT4.0
□ PC compatible computer with Pentium 133 MHz processor or greater
□ 32 Mb of RAM and 4 Mb on hard disk.

■ **Available in kit form comprising**
□ 1 CD-ROM including:
- The SFT 2841 software for configuring Sepam 1000+
- The SFT 2826 software for recovery of disturbance recordings
□ 1 RS232 series link cable PC / Sepam 1000+.

Disturbance recording display software

SFT 2826 software combined with the SFT 2841 software enables recovery of disturbance recording files and their visualisation.



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Metering device

The Power Meter can replace analogue metering devices.
It calculates electrical magnitudes: average values, harmonic distortion rates, etc.
The information it provides allows a reduction in both energy and maintenance costs.
It can be integrated in the "Power Logic System".

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The optional Power Meter display takes the same space as a conventional analogue metering device and can be connected to the Power Meter module using a communications cable.

Function

In addition to its metering functions, the Power Meter range has advanced functions such as:

■ Power quality
Harmonic distortion level in both current and voltage terms.

■ Memorisation of minimum and maximum values
Used for define preventive maintenance.

■ Alarm/relay functions
The PM-650 has on-board alarms. These alarms are triggered when a voltage, current, frequency and phase threshold is exceeded. Moreover, they can also trigger a relay.

■ Event logging
When an alarm appears, the event is logged into the memory (non volatile).

These events are called up on the PC screen.

■ Data recording
This data is saved to the local memory and can then be read on a PC. The user can select the metering data acquisition frequency.

Characteristics

Economical metering

■ One single device replaces a large number of analogue metering instruments.
■ Class 0.2 accuracy for voltage current metering acquisition.
■ Accuracy of RMS values for metering of voltage and current harmonic distortion up to the 31st harmonic.
■ Harmonic distortion rate reading for voltage and current in each phase to give an indication as a percentage of the quality of the waveform.
■ Neutral current monitoring to detect overloading.
■ High speed sampling to monitor, for example current demand peaks.
■ Load monitoring for preventive maintenance.
■ Reallocation of energy costs.
■ Remote input of data provided by the devices through the RS-485 communication port and a PC.

Easy installation

■ It is possible to separate the metering device and the optional screen for very flexible installation.
■ Easy to incorporate in the energy management system.
■ Compact dimensions 114 x 114.

Standard sensors

■ Connection to conventional CT's.
■ Does not require PT up to 600 V.

Communication options

■ Modbus communication.
■ Power impulse output.

Two-line LCD screen

■ Back to back or next to the central device, connected using a cable of maximum length 15 metres.
■ Possible to use as a portable setting tool for Power Meter.
■ Simultaneous display of phase 1.2.3. measurements.

Conformity with standards

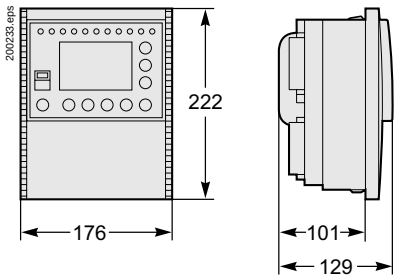
■ Conformity with standards UL. NOM. and CSA
■ CE marking
■ Tested according to standard IEC 1000
■ In conformity with FCC (class A)
■ Vibration and temperature tests.

Additional function

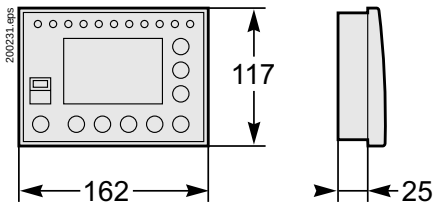
■ Other multi-functional metering devices in the Power Logic range propose among others:
□ magnitudes and angles of the 31 harmonics
□ detection and recording of voltage and current peaks
□ wave form capture…

For more information, please contact us.

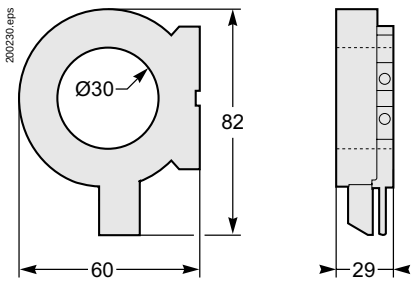
Sepam unit with advanced UMI interface



Remote advanced UMI module



Zero sequence core balance CT
CSH 30



Earthing 58
Indication and interlocking 59

Earthing

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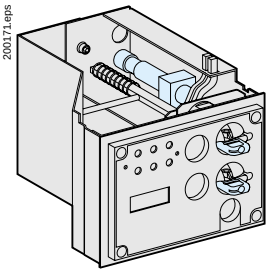

Operating mechanism

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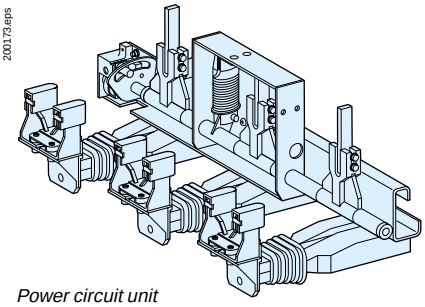

Power circuit unit

Function

This device is used to earth and short circuit the cable ends before work is performed on the cable compartment.

Composition

■ The earthing switch includes:
□ an operating mechanism box to be mounted on the front face of the cubicle
□ a power circuit unit with a fast acting closing mechanism independent of the operator.

■ The link between the 2 devices will have a length depending of the depth of the cubicle. A drawing will define this rod to be manufactured and installed by the panel builder.

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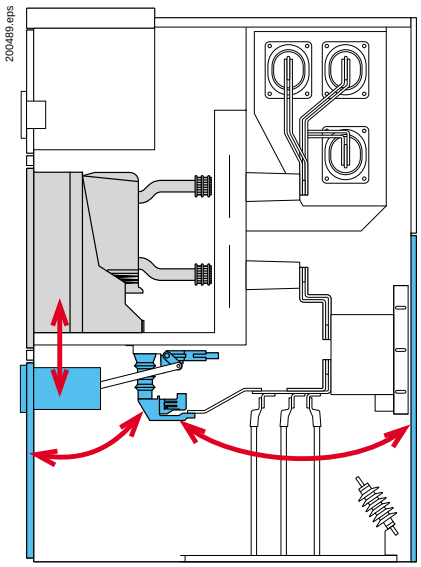
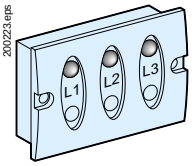


■ Mechanical interlock with the circuit breaker to prevent:
□ to draw in the circuit breaker if the earthing switch is closed
□ to close the earthing switch if the circuit breaker is not opened and drawn out
□ this interlock is realised with Profalux or Ronis key
□ a drawing is showing the mechanical link to be manufactured and installed by the panel builder.

■ Mechanical interlock with the front and rear plate of the cable compartment to prevent access to the cables under voltage
□ a drawing is showing the mechanical link to be manufactured and installed by the panel builder.

Characteristics according to IEC 60 129				
Ur	kV	12	17.5	17.5
Ik for tk = 1s	kA		50	50
Ik for tk = 3s	kA	31.5	31.5	31.5
phase distance	mm	160	200	240

Indication
Interlocking



200223.eps

Voltage Presence Indicator unit

Voltage Presence Indicator System

■ This system combined with the Iso-capacitors integrated as standard in the earthing system provides an indication of the voltage in the phases of the main circuit.

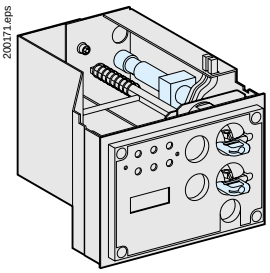
■ It is mounted on the front of the earthing operating mechanism.

■ It is available for two voltage ranges, in conformity with standard IEC 61 958:
□ 3.2 to 7.2 kV
□ 7.2 to17.5 kV.

Open/closed contacts

A series of 6 auxiliary contacts indicates the open/closed position of the earthing switch.

Characteristics			
delivered as standard		4	
maximum quantity		11	
breaking capacity(A)	V AC	240	15
cos ø : 0,3		380	10
		480	10
		600	6
	V DC	48	
		125	
		250	3
		500	0,5


200171.eps

Key locking

Mechanical earthing switch locking

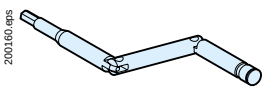
This function enables the earthing switch to be locked in its open or closed position by adding 1 or 2 key locks.

■ Several configurations are available:
□ locked closed by 1 key lock + locked open by 1 key lock.
□ locked closed by 2 key locks
□ locked open by 2 key locks.

A mechanical adaptation kit is delivered to fit the various key locks which are not supplied.

Electromechanical interlocking of the earthing switch

This function is achieved using a coil which blocks switching operation when it is not supplied power. When energised it releases the earthing switch which can then be closed.
The system is available in several versions according to the supply voltage: 24 VDC - 48 VDC - 110 VDC - 220 VDC.


200160.eps

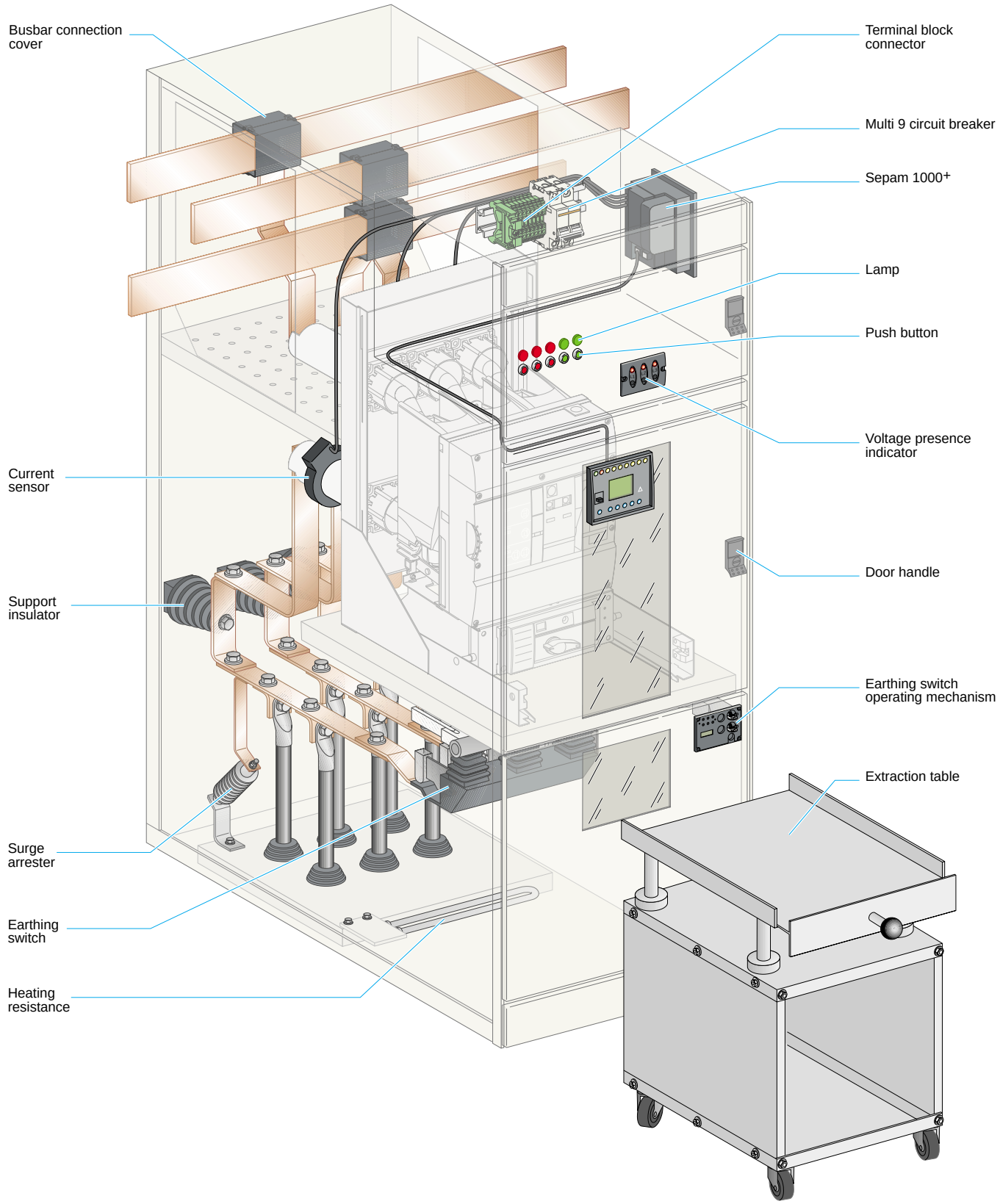
Operating lever

Earthing switch operating lever

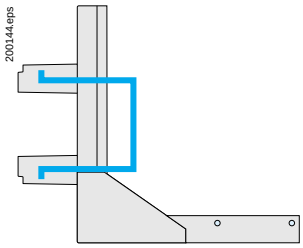
This is identical to the one supplied for the circuit breaker racking truck. It allows the earthing switch to be operated.

Switchboard components **62**
Panorama 62
Operation 63
Cubicle components **65**
Indication, support, heating 65
Protection 66

Panorama


Busbar connection cover
Terminal block connector
Multi 9 circuit breaker
Sepam 1000+
Lamp
Push button
Voltage presence indicator
Current sensor
Door handle
Support insulator
Earthing switch operating mechanism
Extraction table
Surge arrester
Earthing switch
Heating resistance

Operation



Fixed coupling link

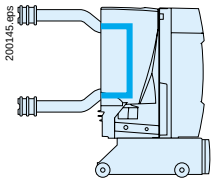
Fixed coupling link

Allows a standard incomer/feeder cubicle to be transformed into a busbar riser cubicle by short circuiting the top and bottom terminals of the cradle.

■ This offer is exclusively available in the form of drawings proposed in the installation manual.

■ This unit comprises 1 bridge/phase and is easily installable by the operator on the cradle bushing fingers.

Electrical characteristics			
Ir	A	1250	2500
Ik	kA	31.5	40



Drawout coupling link

Drawout coupling link

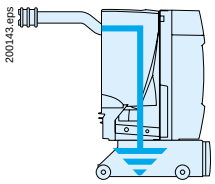
Enables bridging in an existing cubicle of the upstream and downstream circuit in the cubicle. It is installed in place of the withdrawable circuit breaker in the cradle.

■ It includes:

□ a device to lock in the racked-in position using padlocks.

□ an auxiliary PAF contact delivered separately for installation on the cradle : it indicates that the truck is well mechanically racked in.

Electrical characteristics				
Ik	kA	25	31.5	40
tk	S	3	3	3
Ir	A	1250	1250	3150
phase distance	mm	145	185	240



Busbar earthing truck

Busbar earthing truck

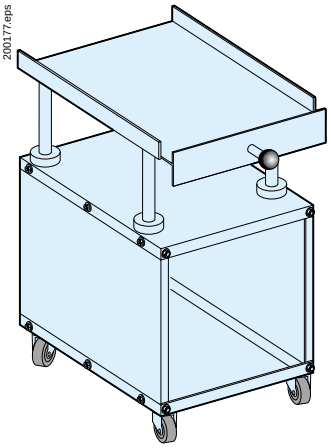
This device is a safety accessory used in place of the withdrawable breaker in order to earth the busbars.

■ Possibility of locking by padlocks in the draw-in position.

Electrical characteristics				
Ur	kV	17.5	17.5	17.5
Ik	kA	25	31.5	40
tk	S	3	3	3
phase distance	mm	145	185	240

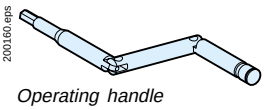
Operation

200177.eps



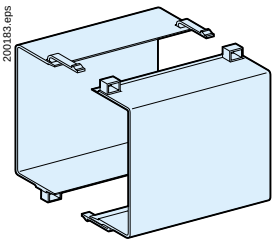
Extraction table

200160.eps



Operating handle

200183.eps



Busbar connection cover

Extraction table

Enables the circuit breaker to be taken out of the cubicle and to handle it during maintenance operations or during cubicle manufacturing.

- A height adjustment device using screw/bolts allows the height to be adjusted to - 20 mm/ + 200 mm.
- A latching device is provided between the extraction table and the cradle.

Operating handle

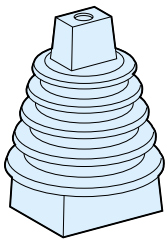
This enables all operations to be carried out on the circuit breaker racking truck as well as on the earthing switch.

Busbar connection cover

This set of 3 insulating covers enables improved dielectric withstand at the busbar connections in the cubicle.

Indication
Support
Heating

200136.eps



Capacitive divider insulator

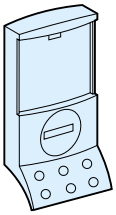
Capacitive divider insulator set

■ This Voltage Presence Indicator System (VPIS) includes:
□ the insulators themselves providing mechanical support and insulation up to 17.5 kV; these insulators also integrate capacitors capable of supplying a voltage potential signal.
□ a voltage indication unit with light to indicate the voltage presence on the front panel covering 2 voltage ranges:
- 3.2 to 7.2 kV
- 7.2 to 17.5 kV

Support insulator

■ This enables mechanical support and voltage insulation at 12 and 17.5 kV
■ Application for busbar and cable fixing and support.

200182.eps

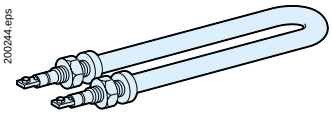


Door handle

Door handle

■ Enables the front panel door of the cubicle to be closed.
Several versions are available:
□ with triangular key lock
□ with Ronis or Profalux type key lock.

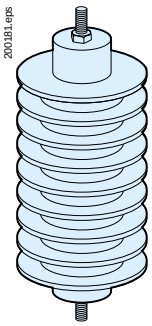
200244.eps



Heating element

Heating element

■ This can be used for 2 reasons:
□ heating the cubicle when the ambient temperature is too low
□ avoiding the formation of condensation.
■ Delivered with its support and without a thermostat.
■ Power: 150 W at 220 V.



Surge arrestor

Surge arresters

Silicone rubber housed metal-oxide surge arresters are intended for over voltage protection of distribution networks : they offer ad-hoc protection against overvoltage from various origins (lighting, switching…).

The VARISIL range is ideal for the various voltage covered by Evolis circuit breakers.

■ Our recommendation when using with Evolis:
□ Ur = 7.2 kV : HD 09
□ Ur = 12 kV : HD 12
□ Ur = 17.5 kV : HD 18

Common characteristics according to IEC 60 099-4

rated discharge current	In (with 8/20 wave)	(kA peak)	10
line discharge class			I
short time withstand current, twice	(with 4/10 wave)	(kA peak)	100
rectangular withstand current, duration 2000 µs		(A peak)(withstand 18 times min.)	300
short circuit withstand		(kA RMS - for 0.2 s)	31.5

Characteristics according to IEC 60 099-4

			HD06	HD09	HD12	HD15	HD18	HD24	HD30	HD36	HD42
rated voltage	Ur	(kA RMS)	6	9	12	15	18	24	30	36	42
maximum continuous service voltage	Uc	(kV RMS)	5	8	10	12	15	20	24	28.8	33.6
rated residual voltage	In	(10 kA)	18	28	42	45	56	72	89	106	120
rated creepage distance		(mm)	380	380	380	380	610	610	910	910	910
mass - option "no"		(kg)	1.5	1.6	1.8	1.8	2.5	2.7	3.5	3.6	3.6

Multi 9 circuit breakers

1 pole

2 poles

3 poles

Function

Control and protection of circuits against overloads and short-circuits for AC and DC applications.

Description

Technical data

- Ratings: 6 to 63 A set at 30°C.
- Voltage rating: 230/400 V AC and 48 V DC.

Electrical characteristics

Ratings	Type	Voltage	Break.Cap.
(A)		(V) AC	(A)
6 to 63	1P	230/400	3000 to 10000
	2.3	400	3000 to 10000

Ratings	Type	Voltage	Break.Cap.
(A)		(V) DC	(A)
1 to 32	1, 2, 3	48	up to 15000

- Number of operating cycles (O-C): 20 000.
- Tripping curves:
  - B curve: the magnetic trip units operate between 3 and 5 In
  - C curve: the magnetic trip units operate between 5 and 10 In.
- Tropicalisation: treatment 2 (relative humidity 95% at 55°C).
- Connection: tunnel terminals for cables up to 25 mm^2.

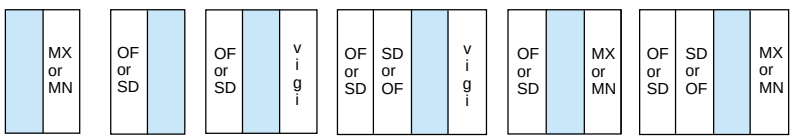
Electrical auxiliaries

The electrical auxiliaries enable the remote tripping or indication of the **Multi 9** circuit-breakers:

- On the left of the circuit breaker for the indication auxiliaries.
- On the right of the circuit breaker for the trip units.

OF auxiliary contact — *SD fault indicating switch* — *Multi 9 circuit-breaker* — *Shunt release* — *Undervoltage release*

Combining the auxiliaries



Remote tripping of Multi 9 circuit breaker

This can be carried out with an MX shunt release or MN undervoltage release fixed on the right of the circuit breaker.

For more information please refer to ART documentation...

Multi 9 circuit breakers

Remote indication

■ OF auxiliary contact
Fixed on the left of the circuit breaker or another auxiliary contact, it enables the indication or control according to the "open" or "closed" position of the circuit breaker.

■ SD fault indicating switch
Fixed on the left of the circuit-breaker, it enables the indication or control according to the "fault tripped" position of the circuit-breaker.
Visualisation of the fault on the front face by mechanical indicator.

■ Connection: screw clamp terminals for:
□ 2 x 1.5 mm^2 cables or 1 x 2.5 mm^2 cable.

Technical data of the auxiliaries

Voltage (V AC or DC)	**Breaking Capacity (cos Ø = 0,6)** (A)
380-415 V AC	3
220-240 V AC	6
250 V DC	0.4
125 V DC	1
48 V DC	2
24 V DC	6

Accessories

Padlocking facility

Enables the locking of the single or two-pole Multi 9 control toggle, in the "open" or "closed" position (by an 8 mm max. padlock, not supplied).

Single or double dividable mounting plate

Possibility to lock the mounting plate by an 8 mm ø padlock (not supplied), with the circuit breaker in the isolated position.

Comb busbars

■ Current permissible at 40°C:
□ 100 A with a central supply point,
□ 125 A with two supply points.

■ Rated insulation voltage: 500 V (according to IEC 664).

■ Short-circuit withstand compatible with the Multi 9 breaking capacity.

■ Connection:
□ the supply is possible:
- by 16 mm^2 semi-rigid cable directly in the device enclosure
- by 25 mm^2 semi-rigid cable using the specific connector.

Terminal shields

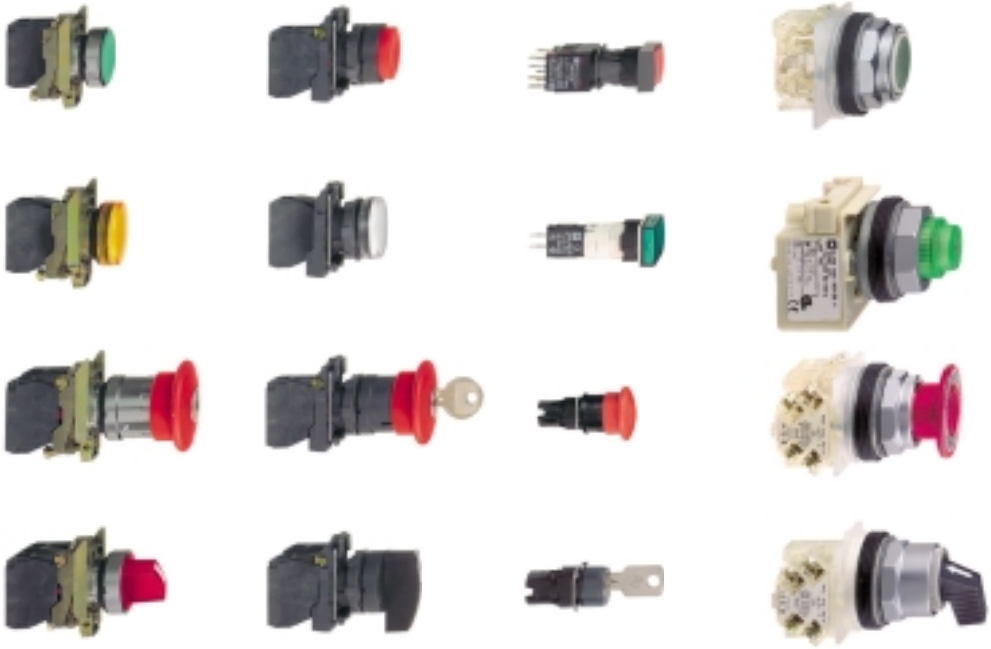
■ Degree of protection: IP 305.

Sealable terminal shield

Enables to install the entire multi 9 on a panel: terminal shield composed of a base with a symmetrical rail and a cover to be screwed (sealable combination).
Passage of the wiring by punched out openings on the sides and the base.

For more information please refer to ART documentation...

Harmony Push Buttons and Indicator Lights

Applications				
				
Specific Features	Modular product With metal collar chrome plated or black Rounded head	Plastic collar Rounded or square head	Plastic collar Rounded, square or rectangular head	Metal collar chrome plated Hexagonal head
Mounting Hole	Ø 22		Ø 16	Ø 30
Range description	Push Buttons Emergency stop buttons Rotary buttons Luminous buttons Indicator lights			
Connection	By screw terminals By connector By adaptor for printed circuit board		By faston cable terminal By pins for printed circuit board	By captive screw terminals
Protection Index according to IEC 529 and NFC 20-010	IP 65 IP 66 (capped push button heads)		IP 65	
Type of device	Harmony style 4 XB4	Harmony style 5 XB5	Harmony style 6 XB6	Harmony style 9

For more information please refer to ART documentation

Harmony Push Button and Indicator Lights

			Digital displays	Profil front panels
Non adaptable product Plastic collar Rounded head		Compact, low consumption Rounded head	LED 7 segments + decimal point	Aluminium front panel for mounting in control and indication units Ø 22
Ø 22 and Ø 25		Ø 8 and Ø 12	Ø 22	–
Push buttons Emergency stop buttons Rotary buttons Indicator lights		LED indicator lights	Displays to be made up: body + 1 digit head	3 sizes of front panel for mounting of 4, 8 or 12 control and indication units Ø 22
By captive screw terminals		Clip connector 2.8 x 0.5 or screw connector	By connector	–
IP 40	IP 54	IP 40 IP 65 (with seal)	IP 65	IP 65
Harmony style 7 XB7 **"Series E"**	XB7 **"Series P"**	XVL-A	ZA2-VA	KTi

For more information, please refer to ART documentation…

Terminal blocks

Applications (connection)	"Screw-screw"								"Spring-spring"	
Nominal cross-section (mm²)	2.5 to16	2.5/4	35	70	150	4	6	10 and 35	2,5	4
Number of poles	1	1	1	1	1	25 or 10	2 or 3	1	1 or 2	1
Snapped in place on & ('	–	–	–	–	–	●	●	●	–	–
& ('	●	–	●	●	●	–	–	–	–	–
& (	–	–	–	–	–	–	–	–	●	●
'	–	–	–	–	–	–	–	–	–	–
Snapped in place on 15 mm rail	–	●	–	–	–	–	–	–	–	–
References	AB1-VV					DB6-CD	DB6-DD	DB6-ED/FD	AB1-RR	

Applications (connection + functions)	Trifunctional with protection conductor		Screw-clips	For supported diode		For supported fuse		
				Fixed	Removable	Fixed	Removable	
Nominal cross-section (mm²)	2.5	2.5	4	4	4	10	4	4
Number of poles	1 neutral disconnectable 1 link V/V	2 linksV/V	1	2	1	1	1	1
Snapped in place on & ('	–	–	–	–	–	–	–	–
& ('	–	–	●	●	●	●	●	–
& (	●	●	–	–	–	–	–	●
'	–	–	–	–	–	–	–	–
Display	–	●	–	–	●	●	●	●
"Screw-screw" "Spring-spring"	●	●	●	●	●	●	●	–
	–	–	–	–	–	–	–	●
References	AB1-TRS	AB1-TRP/TRN	AB1-FV/FC	AB1-D11	AB1-SF/SV	AB1-FU	AB1-SF	AB1-RRSFF

For more information, please refer to ART documentation …

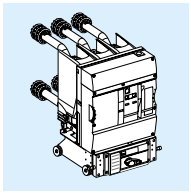
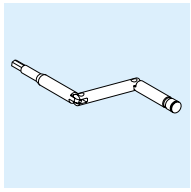
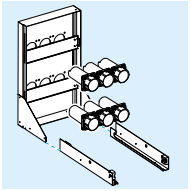
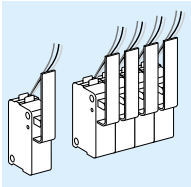
Junction blocks

"Bolt-bolt"	"Bolt-connector"	"Screw-screw" conductor : protection type			"Screw-screw" conductor : neutral type	"Screw-screw" for protection conductor	
95, 185 and 240	95, 150 and 240	2.5-4	4 to 35		4 to 16	2.5	4
1	1	1	1		1	1 or 2	1
–	–	–	–	–	–	–	–
–	–	–	●	●	●	–	–
●	●	–	–	–	–	●	●
●	●	–	–	●	–	–	–
–	–	●	–		–	–	–
AB1-BB	AB1-BC	AB1-TP			AB1-NEN	AB1-RRTP	

For 3-wire proximity detectors		Disconnectable		Staged	Withdrawable				Not withdrawable	Marking accessories
Without PE	With PE	Blade type	Fuse type		From side		From front			
2.5	2.5	4		4	2,5	2,5	1,5	2,5	2.5	–
3	4	1		2	5	10	10	For flat, 20 pole cable	10	–
–	–	–		–	–	–	–	–	–	–
●	–	●		●	–	–	●	●	●	–
–	●	–		–	–	–	–	–	–	–
–	–	–		–	●	–	–	–	–	–
●	●	–	●	●	–		–		–	–
●	●	●	●	●	●		●		●	–
–	–	–	–	–	–		–		–	–
AB1-DDP 235U●●	AB1-DDP 235T●●	AB1-SC	AB1-FUSE	AB1-ET	AB1-BD		AB1-DV/ DVM	AB1-BCP	AB1-BV	AB1-B/R AB1-G/S

For more information, please refer to ART documentation …

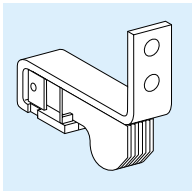
Order form
Full version

Function	Designation				References			Price	Lead Time
					start				
					145 mm	185 mm	240 mm		
p.20/21 **Withdrawable circuit breaker** Composed of: - 1 bloc of 4 O/C position contacts, - 1 racking truck, - 6 arms with clusters.	**kV**	**kA**	**A**	**Evolis**					
	phase distance								
200359 	7.2	25	1250	7P1.1250	59000 ◻				
	12	25	630	17P1.630	59001 ◻				
	12	25	1250	17P1.1250	59002 ◻				
	7.2	25	1250	7P1.1250		59004 ◻			
	17.5	25	630	17P1.630		59005 ◻			
	17.5	25	1250	17P1.1250		59006 ◻			
	7.2	31.5	1250	7P2.1250		59008 ◻			
	17.5	31.5	630	17P2.630		59009 ◻			
	17.5	31.5	1250	17P2.1250		59010 ◻			
	7.2	31.5	2500	7P2.2500			59012 ◻		
	17.5	25	2500	17P1.2500			59014 ◻		
	17.5	31.5	2500	17P2.2500			59015 ◻		
p.24 **Type of racking**									
	manual				59301 ◻	59301 ◻			
	screw / shaft				59450 ◻	59450 ◻	59450 ◻		
p.24 **Operating shaft** (1 per switchboard)									
200295 	operating shaft				59449 ◻	59449 ◻	59449 ◻		
					cradle				
p.24 **Cradle, phase distance**									
200375 	1 cradle / 145 mm				59292 ◻				
	1 cradle / 185 mm					59293 ◻			
	1 cradle / 240 mm						59294 ◻		
p.23 **Low powered CTs for Sepam 1000+**									
200196	3 CVV120			25-3150 A	59390 ◻	59390 ◻			
	3 CVV200			25-3150 A			59391 ◻		
p.24 **Draw in/out position signaling**									
200227 	4 AC + 1 AC PAF				59170 ◻	59170 ◻	59170 ◻		

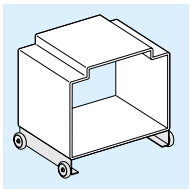
Order form
Full version

Function	Designation	References	Price	Lead Time
		options		
p.24 **Additional earthing device** Composed of: - 1 CB sliding contact, - 1 cubicle copper bar.	earthing sliding contact	**59451** ◻		
p.25 **CB footing** Composed of: - a roller kit, - a drawing.	support	**59050** ◻		
p.24 **Adaptation kit in case of application with SE earthing switch**	see drawings in the "installation guide"			
		fitted accessories are mandatory		

200280



200191



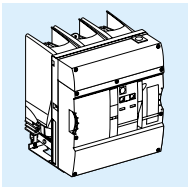
Order form modular version

Function	Designation	References	Price	Lead Time

p.26/27

Basic breaker

Composed of:
1 bloc of 4 O/C
position contacts.

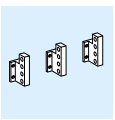


kV	kA	A	Evolis	start	145 mm	185 mm	240 mm
			phase distance				
7.2	25	1250	7P1.1250		59026 ◻		
12	25	630	17P1.630		59027 ◻		
12	25	1250	17P1.1250		59028 ◻		
12	25	1600	17P1.1600		59029 ◻		
7.2	25	1250	7P1.1250			59030 ◻	
17.5	25	630	17P1.630			59031 ◻	
17.5	25	1250	17P1.1250			59032 ◻	
17.5	25	1600	17P1.1600			59033 ◻	
7.2	31,5	1250	7P2.1250			59034 ◻	
17.5	31.5	630	17P2.630			59035 ◻	
17.5	31.5	1250	17P2.1250			59036 ◻	
17.5	31.5	1600	17P2.1600			59037 ◻	
7.2	31.5	2500	7P2.2500				59038 ◻
17.5	25	2500	17P1.2500				59040 ◻
17.5	31.5	2500	17P2.2500				59041 ◻

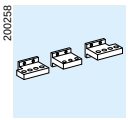
MV connections

p.28

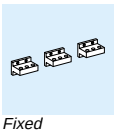
Type of upstream fixed connection to be mounted on basic CB or bushings



*Variable V**



*Variable H**

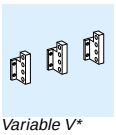


Fixed

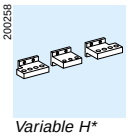
3 fixed distance H or V	630-1600A	59400 ◻	
3 variable distance H	630-1600A	59401 ◻	
3 variable distance V	630-1600A	59402 ◻	
3 fixed distance H or V	1250-2500A		59403 ◻
3 variable distance H	1250-2500A		59404 ◻
3 variable distance V	1250-2500A		59405 ◻

p.28

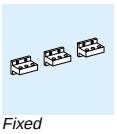
Type of downstream fixed connection to be mounted on basic CB or bushings



*Variable V**



*Variable H**

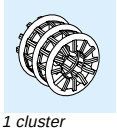


Fixed

3 fixed distance H or V	630-1600A	59400 ◻	
3 variable distance H	630-1600A	59401 ◻	
3 variable distance V	630-1600A	59402 ◻	
3 fixed distance H or V	1250-2500A		59403 ◻
3 variable distance H	1250-2500A		59404 ◻
3 variable distance V	1250-2500A		59405 ◻

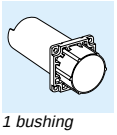
p.29

Type of withdrawable connections

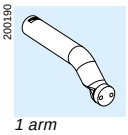


1 cluster

1 finger



1 bushing

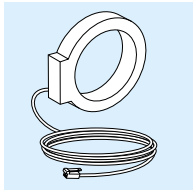
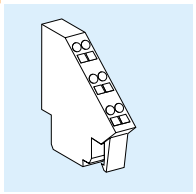
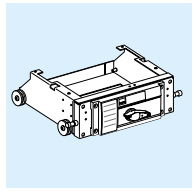
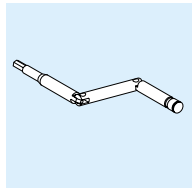
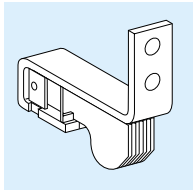
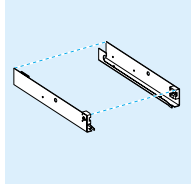


1 arm

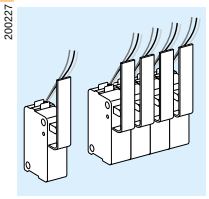
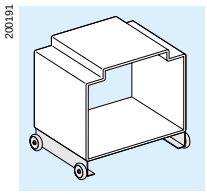
6 clusters/fingers	630-1250A	59373 ◻			
6 bushings/arms&clusters	630-1250A		59374 ◻		
6 clusters/fingers	1250-2500A			59375 ◻	
6 bushings/arms&clusters	1250-2500A				59376 ◻

V: vertical, H*: horizontal*

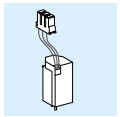
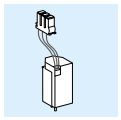
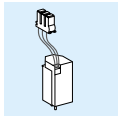
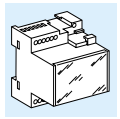
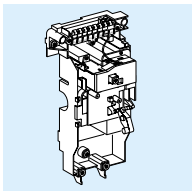
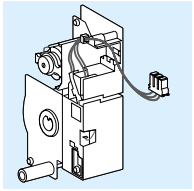
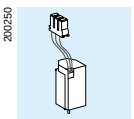
Order form modular version

Function	Designation	References	Price	Lead Time
p.30 Low powered CTs for Sepam 1000+				
	3 CVV 120 25-3150 A	59390 □		
	3 CVV 200 25-3150 A	59391 □		
		fixed & d/o options		
p.31 LV terminal blocks				
	fixed CB terminal blocks	59081 □		
p.31 Type of racking				
	manual	59301 □		
	screw / shaft mandatory for 240 mm phase distance	59450 □		
p.31 Operating shaft (1 per switchboard)				
	operating shaft	59449 □		
p.31 Additional earthing device				
	earthing sliding contact	59451 □		
		cradle		
p.31 Racking base				
	racking base	59300 □		

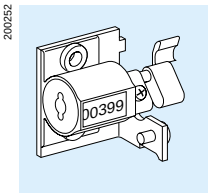
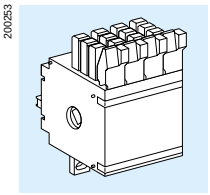
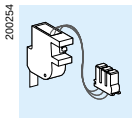
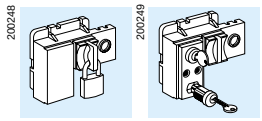
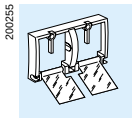
Order form modular version

Function	Designation	References	Price	Lead Time
p.31 **Draw in/out position signaling**				
 200227	4 AC + 1 AC PAF	59170 □		
		others		
p.32 **CB footing** composed of: - a roller kit, - a drawing.	support	59050 □		
 200191				
p.31 **Adaptation kit in case of application with SE earthing switch**				
	see drawings in the "installation guide"			
		fitted accessories are mandatory		

Order form
Fitted accessories

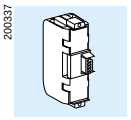
Function	Designation		References	Price	Lead Time
			remote control ↓ start		
p.34 **MX opening shunt trip voltage**					
 200250	24…30V	DC 50/60 Hz	59133 ☐		
	48…60V	DC 50/60 Hz	59134 ☐		
	100…130V	DC 50/60 Hz	59135 ☐		
	200…250V	DC 50/60 Hz	59136 ☐		
p.34 **Additional MX opening shunt trip voltage**					
 200250	24…30V	DC 50/60 Hz	59137 ☐		
	48…60V	DC 50/60 Hz	59138 ☐		
	100…130V	DC 50/60 Hz	59139 ☐		
	200…250V	DC 50/60 Hz	59140 ☐		
p.34 **MN undervoltage shunt trip voltage**					
 200250	24…30V	DC 50/60 Hz	59150 ☐		
	48…60V	DC 50/60 Hz	59151 ☐		
	100…130V	DC 50/60 Hz	59152 ☐		
	200…250V	DC 50/60 Hz	59153 ☐		
p.34 **Time delay unit for MN, MN time setting**					
 200271	48…60V	DC 50/60 Hz	33680 ☐		
	100…130V	DC 50/60 Hz	33681 ☐		
	200…250V	DC 50/60 Hz	33682 ☐		
p.33 **MITOP low energy release**					
 200260	mitop 200-250 V	AC 50/60 Hz	59160 ☐		
p.36 **MCH motor voltage**					
 200251	24…30V	DC	59162 ☐		
	48…60V	DC 50/60 Hz	59163 ☐		
	100…125V	DC	59164 ☐		
	200…250V	DC	59165 ☐		
	100…130V	AC 50/60 Hz	59166 ☐		
	200…240V	AC 50/60 Hz	59167 ☐		
p.36 **XF closing coil release**					
 200250	24…30V	DC 50/60 Hz	59145 ☐		
	48…60V	DC 50/60 Hz	59146 ☐		
	100…130V	DC 50/60 Hz	59147 ☐		
	200…250V	DC 50/60 Hz	59148 ☐		

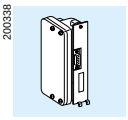
Order form
Fitted accessories

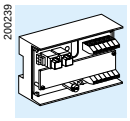
Function	Designation	References	Price	Lead Time
p.37 Operation counter				
	operation counter	59085 ☐		
signaling				
p.37 Additional auxiliary contacts				
	4 AC "silver"	59090 ☐		
p.37 Indication of CB ready to close PF				
	1 AC PF	59091 ☐		
interlocking systems				
p.38 Open position CB interlocking				
	for lock & key	59336 ☐		
	for padlock supplied by client	59337 ☐		
p.38 Lock & key configuration				
	with one lock RONIS	59338 ☐		
	with 2 idem locks RONIS	59339 ☐		
	with 2 differents locks RONIS	59341 ☐		
	with one lock PROFALUX	59340 ☐		
	with 2 idem locks PROFALUX	59343 ☐		
	with 2 differents locks PROFALUX	59342 ☐		
p.38 Padlocking of O/C push button				
	for padlock supplied by client	59344 ☐		
end				

Order form: Sepam 1000+

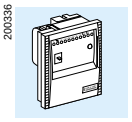
Function	Designation	References	Price	Lead Time
start				
p.47 Application type				
Substation	S20	59620 □		
Transformer	T20	59621 □		
Motor	M20	59622 □		
Busbar	B21	59624 □		
Busbar	B22	59625 □		
p.50 Line sensors type				
1/5A CT current connector	CCA630	59630 □ 59630 □		
LPCTcurrent input connector	CCA670	59631 □ 59631 □		
VT voltage input connector	CCT640	59632 □		
p.48 8 inputs temperature module				
8 temperature sensors module	MET148	59640 □		
p.46 Remote modules cord				
L = 0.6 m	CCA770	59660 □		
L = 2 m	CCA772	59661 □		
L = 4 m	CCA774	59662 □		
p.46 Operating language				
English / French		59609 □		
English / Italian		59610 □		
English / Spanish		59611 □		
English / Polish		59612 □		
English / Swedish		59613 □		
English / Local		□		
p.46 User Machine Interface				
Basic UMI		UX		
Advanced UMI		UD		

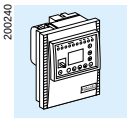
200337

CCA630

200338

CCT640

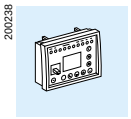
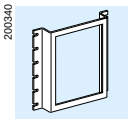
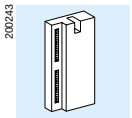
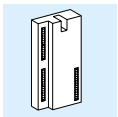
200239


200339

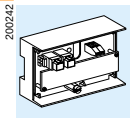
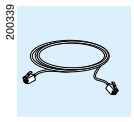
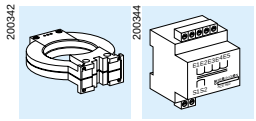
200336


200240


Order form: Sepam 1000+

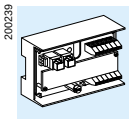
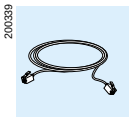
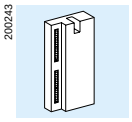
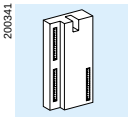
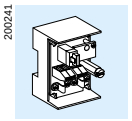
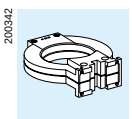
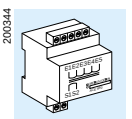
Function	Designation	References	Price	Lead Time
p.46 Remote advanced UMI module				
	DSM303	59608 ☐		
p.46 Remote modules cord				
L = 0.6 m	CCA770	59660 ☐		
L = 2 m	CCA772	59661 ☐		
L = 4 m	CCA774	59662 ☐		
p.46 Mounting accessorie				
Mounting plate	AMT840	59670 ☐		
				
p.46 Power supply				
Sepam/basic				
UMI/24V/70°C	S10 UX xxx J xx xAT	59602 ☐		
UMI/48-250V/70°C	S10 UX xxx J xx xUT	59603 ☐		
Sepam/advanced				
UMI/24V/70°C	S10 UD xxx J xx xAT	59606 ☐		
UMI/48-250V/70°C	S10 UD xxx J xx xUT	59607 ☐		
p.46 Power supply connector				
Screw type connector	CCA620	59668 ☐		
Ring lug connector	CCA622	59669 ☐		
p.51 Input/Output module				
4 inputs + 4 outputs module	MES108	59645 ☐		
10 inputs + 4 outputs module	MES114	59646 ☐		
 				
p.52 Communication interface				
RS485 network interface 2 wires	ACE949-2	59642 ☐		
4 wires	ACE959	59643 ☐		
p.52 Communication Cord				
L = 3 m	CCA612	59663 ☐		

Order form: Sepam 1000+

Function	Designation	References	Price	Lead Time
p.51 Analog output module				
	MSA141	59647 ☐		
p.51 Remote modules cord				
L = 0.6 m	CCA720	59660 ☐		
L = 2 m	CCA772	59661 ☐		
L = 4 m	CCA774	59662 ☐		
				
p.50 Core balance				
Residual current sensor d=120	CSH120	59635 ☐		
Residual current sensor d=200	CSH200	59636 ☐		
Interposing ring CT for Io	CSH30	59634 ☐		
Core balance CT interface	ACE990	59672 ☐		
				

end

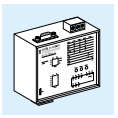
Order form: accessories Sepam 1000+

Function	Designation	References	Price	Lead Time
p.51 8 inputs temperature module				
8 temperature sensors module	MET148	59640 ☐		
				
p.51 Remote modules cord				
L = 0.6 m	CCA770	59660 ☐		
L = 2 m	CCA772	59661 ☐		
L = 4 m	CCA774	59662 ☐		
				
p.51 Analog output module				
	MSA141	59647 ☐		
p.51 Input/Output module				
4 inputs + 4 outputs module	MES108	59645 ☐		
10 inputs + 4 outputs module	MES114	59646 ☐		
 				
p.52 Communication interface				
RS485 network interface 2 wires	ACE949-2	59642 ☐		
4 wires	ACE959	59643 ☐		
				
p.52 Communication Cord				
L = 3 m	CCA612	59663 ☐		
p.50 Core balance				
Residual current sensor d=120	CSH120	59635 ☐		
Residual current sensor d=200	CSH200	59636 ☐		
Interposing ring CT for Io	CSH30	59634 ☐		
Core balance CT interface	ACE990	59672 ☐		
 				
p.46 Mounting accessory				
Mounting plate	AMT840	59670 ☐		

Order form: accessories Sepam 1000+

Function	Designation	References	Price	Lead Time
p.52 Communication accessories				
RS485/RS232 converter	ACE909-2	59648 ☐		
RS485/RS485 interface (AC)	ACE919 AC	59649 ☐		
RS485/RS485 interface (DC)	ACE919 DC	59650 ☐		

200345



p.53 Configuration software				
PC configuration software kit	kit SFT2841	59671 ☐		

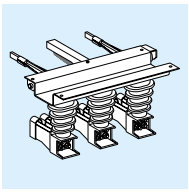
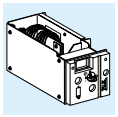
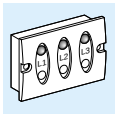
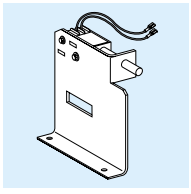
200351

Connectors				
2 sets of spare connectors	KIT 2640	59676 ☐		
PC connection cord	CCA783	59664 ☐		
LPCT test plug	CCA613	59666 ☐		
LPCT injection adaptor	ACE917	59667 ☐		
User's manual in French	PCRED399040FR	59674 ☐		
User's manual in English	PCRED399040EN	59675 ☐		

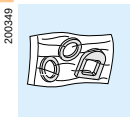
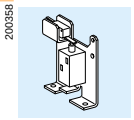
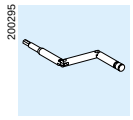
200352

200346

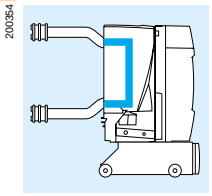
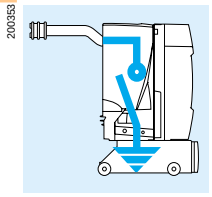
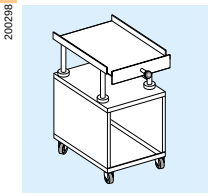
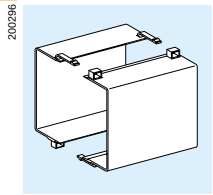
Order form:
earthing switch (ES)
voltage presence indicator system (VPIS)
d/o circuit breaker interlocking

Function	Designation	References	Price	Lead Time
Cubicle functions		start		
	incomer or feeder			
	busbar metering			
	d/o bus section			
	d/o CB or truck with ES			
	d/o CB or truck without ES			
	direct incomer without ES			
	with ES			
	without ES			
p.58 **Earthing switch (ES): Power circuit**		Earthing switch and VPIS		
	12kV 160mm 31.5kA-3s	59490 □	59490 □	
	17.5kV 200mm 31.5kA-3s & 50kA-1s	59491 □	59491 □	
	17.5kV 240mm 31.5kA-3s & 50kA-1s (phase distance in mm)	59492 □		
3 insulators mounted on a support				
	160 mm	59487 □	59487 □	59487 □
	200 mm	59488 □	59488 □	59488 □
	240 mm	59489 □	59489 □	59489 □
p.58 **Operating mechanism**				
	box with mechanism	59496 □	59496 □	
	box with voltage indication	59497 □	59497 □	59497 □
p.59 **Voltage indication**				
	3.2 - 7.2 kV	59498 □	59498 □	59498 □ 59498 □ 59498 □
	7.2 - 17.5 kV	59499 □	59499 □	59499 □ 59499 □ 59499 □
p.59 **Auxiliary contact**				
	6 AC (3NO 3NC)	59502 □	59502 □	
p.59 **Interloking for O/C position (without locks)**				
	for 1 lock O & 1 lock C	59506 □	59506 □	
	for 2 locks O	59508 □	59508 □	
	for 2 locks C	59509 □	59508 □	
p.59 **Electromagnetic interlocking for E.S O/C position**				
	24V DC	59513 □	59513 □	
	48V DC	59514 □	59514 □	
	110V DC	59515 □	59515 □	
	220V DC	59516 □	59516 □	

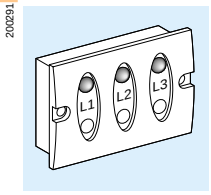
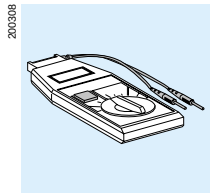
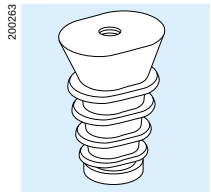
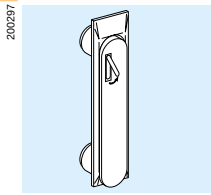
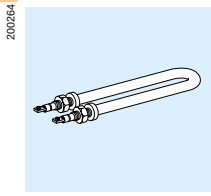
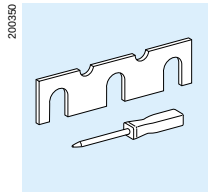
Order form:
earthing switch (ES)
voltage presence indicator system (VPIS)
d/o circuit breaker interlocking

Function	Designation	References	Price	Lead Time
		Circuit breaker interlocking		
p.59 **d/o CB position locking**				
	d/o CB interlocking	59521 □		
		59521 □		
p.59 **Electromagnetic interlocking for CB O/C position**				
	24V DC	59526 □		
		59526 □		
	48V DC	59527 □		
		59527 □		
	110V DC	59528 □		
		59528 □		
	220V DC	59529 □		
		59529 □		
p.59 **Interlocking by lock (lock not supplied)**				
	Ronis / Profalux keylock	59523 □		
		59523 □		
p.59 **Operating shaft = 1 per switchboard**				
	switchboard accessories			
		End		

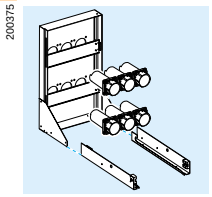
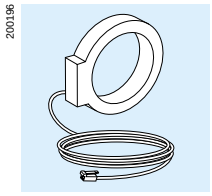
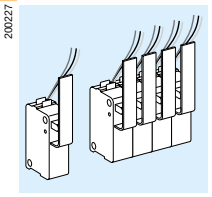
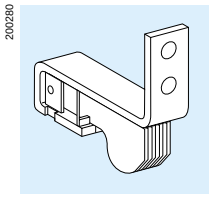
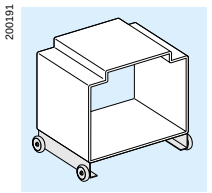
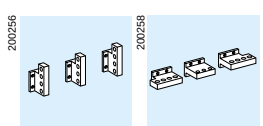
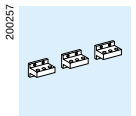
Order form: switchboard components

Function	Designation	References	Price	Lead Time
		switchboard components		
p.63 **Fixed coupling link**				
	go to installation notice: drawings			
p.63 **Withdrawable coupling link: phase-distance, Ith, Ir**				
	145 mm 25 kA 1250 A	59440		
	185 mm 31.5 kA 1250 A	59441		
	240 mm 40 kA 3150 A	59442		
p.63 **Busbar earthing truck**				
	145 mm 17.5 kV 25 kA 3 s	59470		
	185 mm 17.5 kV 31.5 kA 3 s	59471		
	240 mm 17.5 kV 40 kA 3 s	59472		
p.64 **CB extraction table**				
	upper table + complete device drawing	59084		
	complete extraction table	59132		
p.64 **Operation shaft common to earthing switch & CB racking**				
	operating shaft	59449		
p.64 **Busbar connection**				
	busbar cover	59420		

Order form: switchboard components

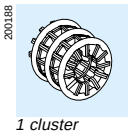
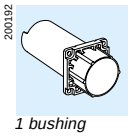
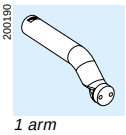
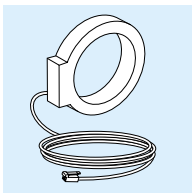
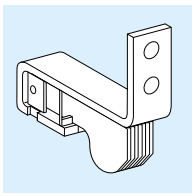
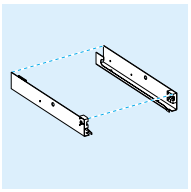
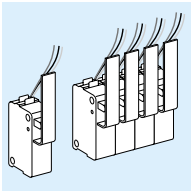
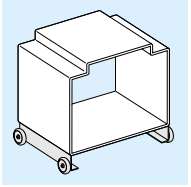
Function	Designation	References	Price	Lead Time
		cubicle components		
p.59 Voltage indication				
 200291	box 3.2 - 7.2 kV	**59498** ◻		
	box 7.2 - 17.5 kV	**59499** ◻		
Phase comparator				
 200308	phase comparator	**59448** ◻		
p.65 Voltage indicator insulator				
 200263	3 voltage insulators	**59430** ◻		
p.65 Insulator support				
	3 standard insulators	**59431** ◻		
p.65 Cubicle compartement handles				
 200297	handles	**59270** ◻		
	handle with key	**59271** ◻		
p.65 Heating resistor				
 200264	heating resistance	**59280** ◻		
		tools for partners		
jig for CB/cradle changeability & wiring tool & set for arm fixation				
 200350	jig mandatory for each partner & wiring tool & fixation set	**59310** ◻		

Order form: separate accessories

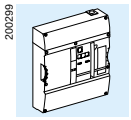
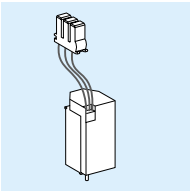
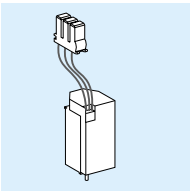
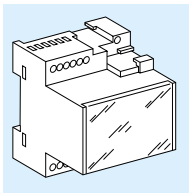
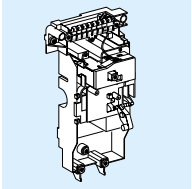
Function	Designation	References	Price	Lead Time
		for full CB version		
p.24 Cradle, phase distance				
 200375	cradle / 145 mm	59292 ☐		
	cradle / 185 mm	59293 ☐		
	cradle / 240 mm	59294 ☐		
p.30 Low powered CTs for Sepam 1000+ mounted on lower cradle bushings				
 200196	3 CVV120 25-3150 A	59390 ☐		
	3 CVV200 25-3150 A	59391 ☐		
p.24 Draw in/out position signaling				
 200227	4 AC + 1 AC PAF	59170 ☐		
p.24 Additional earthing device				
 200280	earthing sliding contact	59451 ☐		
p.32 CB footing				
 200191	support	59050 ☐		
p.28 Type of fixed connection (3 units), Ir to be mounted on basic CB or bushings				
 200256 200258	fixed distance H or V 630-1600 A	59400 ☐		
	variable distance H 630-1600 A	59401 ☐		
	variable distance V 630-1600 A	59402 ☐		
	fixed distance H or V 1250-2500 A	59403 ☐		
 200257	variable distance H 1250-2500 A	59404 ☐		
	variable distance V 1250-2500 A	59405 ☐		

V: vertical, H*: horizontal*

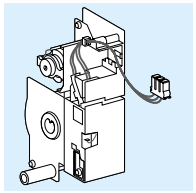
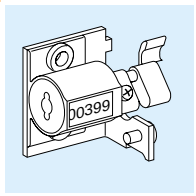
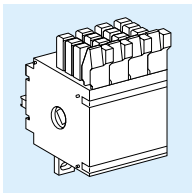
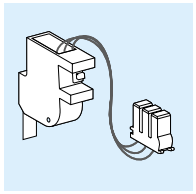
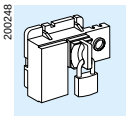
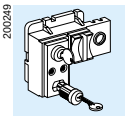
Order form: separate accessories

Function	Designation	References	Price	Lead Time
		for modular CB version		
p.29 Type of withdrawable connections				
 1 cluster 1 finger	3 clusters/fingers 630-1250A	59369 ☐		
	3 clusters/fingers 1250-2500A	59371 ☐		
	3 bushings/arms&clusters 630-1250A	59370 ☐		
	3 bushings/arms&clusters 1250-2500A	59372 ☐		
 1 bushing  1 arm	3 arms 630-1250A	59396 ☐		
	3 arms 1250-2500A	59397 ☐		
	3 bushings without fingers 630-1250A	59406 ☐		
	3 bushings without fingers 1250-2500A	59407 ☐		
p.30 Low powered CTs for Sepam 1000+				
	3 CVV120 25-3150 A	59390 ☐		
	3 CVV200 25-3150 A	59391 ☐		
p.24 Additional earthing device				
	earthing sliding contact	59451 ☐		
p.31 Racking base				
	racking base	59300 ☐		
p.31 Draw in/out position signaling				
	4 AC + 1 AC PAF	59170 ☐		
p.32 CB footing				
	support	59050 ☐		

Order form: separate accessories

Function	Designation		References	Price	Lead Time
			for CB mechanism		
Loose CB cover					
 200299	loose CB cover		**59078** ◻		
User manual					
	User manual		**59077** ◻		
Unit LV terminal block for drawout installation					
	1 drawout CB terminal block		**47849** ◻		
Unit LV terminal block for fixed installation					
	1 fixed CB terminal block		**47074** ◻		
p.34 **MX1, MX2, XF coil voltage**					
 200250	24…30V	DC 50/60 Hz	**59141** ◻		
	48…60V	DC 50/60 Hz	**59142** ◻		
	100…130V	DC 50/60 Hz	**59143** ◻		
	200…250V	DC 50/60 Hz	**59144** ◻		
p.34 **MN undervoltage shunt trip voltage**					
 200250	24…30V	DC 50/60 Hz	**33668** ◻		
	48…60V	DC 50/60 Hz	**33669** ◻		
	100…130V	DC 50/60 Hz	**33670** ◻		
	200…250V	DC 50/60 Hz	**33671** ◻		
p.34 **MN time setting (0.5 - 0.9 - 1.5 - 3s) voltage**					
 200271	48…60V	DC 50/60 Hz	**33680** ◻		
	100…130V	DC 50/60 Hz	**33681** ◻		
	200…250V	DC 50/60 Hz	**33682** ◻		
p.33 **MITOP**					
 200260	mitop 200-250 V	AC 50/60 Hz	**59160** ◻		

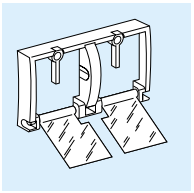
Order form: separate accessories

Function	Designation		References	Price	Lead Time
p.36 MCH motor voltage					
 200251	24…30V	DC	47888		
	48…60V	DC	47889		
	100…125V	DC	47890		
	200…250V	DC	47891		
	48…60V	DC 50/60 Hz	47889		
	100…130V	DC 50/60 Hz	47893		
	200…240V	DC 50/60 Hz	47894		
p.37 CDM operating counter					
 200252	operation counter		48535		
p.37 Aditionnal auxiliary contacts					
 200253	4 AC "sliver"		47887		
p.37 Indication of CB ready to close PF					
 200254	1 AC PF		47080		
p.38 Open position CB interlocking					
 200248  200249	for lock & key		48541		
	for padlock supplied by client		48539		
p.38 RONIS lock & key configuration					
	with one lock		41940		
	with 2 idem locks		41950		
	with 2 different locks		59341		
p.38 PROFALUX lock & key configuration					
	with one lock		42888		
	with 2 idem locks		42878		
	with 2 different locks		59342		

Order form: separate accessories

Function	Designation	References	Price	Lead Time
Padlocking of O/C push button (p.39)				
	for padlock supplied by client	48536 □		

200255



3 MV connectors shield, Ir				
	630-1250 A	59435 □		
	2500 A	59436 □		
Labels kit for Push Button & indicator (O/C)				
	ANSI labels green red	59100 □		
Auto discharge device				
	auto discharge	59080 □		